Exhibit B

SYSTEM, METHOD, AND COMPUTER PROGRAM PRODUCT FOR LOCATION AND/OR RELEVANCY BASED TRIGGERS FOR MOBILE DEVICES

RELATED APPLICATION(S)

[0001] The present application claims the priority of a previously filed U.S. Provisional Application filed 03/01/2011 under serial number 61/517,584, which is incorporated herein by reference in its entirety.

BACKGROUND AND FIELD OF THE INVENTION

[0002] The present invention relates to network communications, and more particularly to network communications with mobile devices.

SUMMARY

[0003] A system, method, and computer program product are provided for location and/or relevancy based triggers for mobile devices. In one embodiment, a location is identified, and information is communicated with the at least one mobile device, based on the location. In another embodiment, information and relevancy data is received at at least one mobile device, and the information is conditionally displayed with the at least one mobile device, based on the relevancy data.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] Figure **1** illustrates a network architecture, in accordance with one possible embodiment.

[0005] Figure **2** illustrates an exemplary system, in accordance with one embodiment.

[0006] Figure **3** illustrates a method providing a location based trigger for a mobile device, in accordance with one embodiment.

[0007] Figure **4** illustrates a method providing a relevancy based trigger for a mobile device, in accordance with another embodiment.

[0008] Figure **5** illustrates a system for location and/or relevancy based triggers for mobile devices, in accordance with yet another embodiment.

[0009] Figure **6A** illustrates a system for hierarchical information distribution and collection by region, in accordance with still yet another embodiment.

[0010] Figure **6B** illustrates a system for hierarchical information distribution and collection by network technology, in accordance with yet another embodiment.

[0011] Figure **7** illustrates a message structure, in accordance with another embodiment.

[0012] Figure **8** illustrates location header formats, in accordance with yet another embodiment.

[0013] Figure **9** illustrates location encoding formats, in accordance with yet another embodiment.

[0014] Figure **10** illustrates a service header, in accordance with yet another embodiment.

[0015] Figure **11** illustrates service encoding formats, in accordance with still yet another embodiment.

[0016] Figure **12** illustrates hardware of a location proxy server apparatus, in accordance with another embodiment.

[0017] Figure **13** illustrates a method for data distribution, in accordance with another embodiment.

[0018] Figure **14** illustrates a method for data collection, in accordance with another embodiment.

[0019] Figure **15** illustrates a method for data re-broadcasting, in accordance with another embodiment.

[0020] Figure **16** illustrates an attribute interface, in accordance with another embodiment.

[0021] Figure **17** illustrates a method for configuration of compound locations for information distribution using information collection, in accordance with yet another embodiment.

[0022] Figure **18** illustrates various user information delivery interfaces, in accordance with still yet another embodiment.

[0023] Figure **19** illustrates an automotive system, in accordance with another embodiment.

[0024] Figure **20** illustrates automotive information delivery using augmented reality, in accordance with yet another embodiment.

DETAILED DESCRIPTION

[0025] Figure **1** illustrates a network architecture **100**, in accordance with one possible embodiment. As shown, at least one network **102** is provided. In the context of the present network architecture **100,** the network **102** may take any form including, but not limited to a telecommunications network, a local area network (LAN), a wireless network, a wide area network (WAN) such as the Internet, peer-to-peer network, cable network, etc. While only one network is shown, it should be understood that two or more similar or different networks **102** may be provided.

[0026] Coupled to the network **102** is a plurality of devices. For example, a server computer **104** and an end user computer **106** may be coupled to the network **102** for communication purposes. Such end user computer **106** may include a desktop computer, lap-top computer, and/or any other type of logic. Still yet, various other devices may be coupled to the network **102** including a personal digital assistant (PDA) device **108**, a mobile phone device **110**, a television **112**, a vehicle **114**, etc.

[0027] Figure **2** illustrates an exemplary system **200**, in accordance with one embodiment. As an option, the system **200** may be implemented in the context of any of the devices of the network architecture **100** of Figure **1**. Of course, the system **200** may be implemented in any desired environment.

[0028] As shown, a system **200** is provided including at least one central processor **201** which is connected to a communication bus **202**. The system **200** also includes main memory **204** [e.g. random access memory (RAM), etc.]. The system **200** also includes a graphics processor **206** and a display **208**.

[0029] The system **200** may also include a secondary storage **210**. The secondary storage **210** includes, for example, a hard disk drive and/or a removable storage drive, representing a floppy disk drive, a magnetic tape drive, a compact disk drive, etc. The

removable storage drive reads from and/or writes to a removable storage unit in a well known manner.

[0030] Computer programs, or computer control logic algorithms, may be stored in the main memory **204**, the secondary storage **210**, and/or any other memory, for that matter. Such computer programs, when executed, enable the system **200** to perform various functions (to be set forth below, for example). Memory **204**, storage **210** and/or any other storage are possible examples of tangible computer-readable media.

[0031] Figure **3** illustrates a method **300** providing a location based trigger for a mobile device, in accordance with one embodiment. As an option, the method **300** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the method **300** may be carried out in any desired environment. Further, the aforementioned definitions may equally apply to the description below.

[0032] As shown in operation **302**, a location is identified. In the context of the present description, such location may include any location and may be identified in any desired manner. For example, the location may be a point (e.g. a particular geographical coordinates), an area (e.g. a set of geographical coordinates, a city, etc.), a volume, a road (or segment thereof), a place of business, a road intersection, a landmark, and/or any other location described herein.

[0033] As a further option, the location may be a location that has been predetermined. For example, the location may be one of a plurality of predetermined locations. Such predetermined location(s) may be configured by a user of the mobile device, a content and/or service provider, etc. Furthermore, the location(s) may be predetermined by a content and/or service provider, exemplary reasons for which will be set forth more detail below.

[0034] As yet another option, the location may be one having at least one predetermined physical and/or logical attribute. For example, the physical attribute may

be an address or other geographic coordinates, a region defined by physical boundaries (e.g. a shopping center, a sports venue, a political region such as a city or county, etc.). As other examples, the logical attributes may be types of venues (e.g. sports facilities, theatres, parks, etc.), categories of retail stores or service venues (e.g. shoe stores, drug stores, clothing stores, hobby stores, sports clubs, etc.), facilities associated with specific brands (e.g. all facilities associated with a given brand or company), locations associated with specified attributes such as places where a specified density of people meeting some specified demographic (e.g. age, gender, hobbies, interests, friends, etc.), etc.

[0035] Moreover, the location may be identified in any manner. In one embodiment, the location may be identified by being received. Just by way of example, it may be received by a network component that is separate from the mobile device, and optionally in communication with the mobile device (e.g. via a network, such as any of the networks described above with reference to Figure **1**). As another example, the location may be received from/utilizing the mobile device.

[0036] In another embodiment, the location may be identified by querying a database (e.g. for a location of the mobile device, for mobile devices at the location, etc.). For example, the database may store mobile device locations. Such mobile device locations stored in the database may be periodically updated, updated in response to a change in location of mobile devices, etc. In this way, the location may be identified by as a result of the query to the database indicating that the mobile device is present at the location

[0037] In yet another embodiment, the location may be identified utilizing a global positioning system (GPS), digital map, or any other location identifying device. Thus, as an option, the location identifying device may be a component of the mobile device. Of course, however, the location identifying device may or may not be associated with the mobile device in any manner.

[0038] Further, as shown in operation **304**, information is communicated with at least one mobile device, based on the location. In the context of the present description, the mobile device (or otherwise referred to as mobile device) may be any device with mobile

communication capabilities. For example, the mobile device may be a wireless PDA, a mobile phone device, a wireless tablet computer, a smartphone, a wireless navigation device, a vehicle (such as a boat, car, plane, train, etc.), etc. It should be noted that while only one mobile device is referenced below, the present method **300** may be used with respect to a plurality of mobile devices, in other embodiments.

[0039] Also in the context of the present description, the information may be any type of information capable of being communicated (e.g. provisioned, transmitted, broadcasted, messaged, displayed, etc.) with respect to the mobile device. Just by way of example, the information may be content (e.g. an advertisement, coupon, digital media, etc.). As another example, the information may be a service (e.g. mobile communications service, etc.).

[0040] It should be noted that the communication of the information may involve any type of communication enabled with respect to the mobile device. For example, the communication may involve a wireless communication protocol. In various embodiments, the communication may include broadcasting the information (i.e. broadcast communications), addressing the information (i.e. addressed communications), etc.

[0041] In one embodiment, the information may be communicated by receiving the information. Optionally, the mobile device may receive the information (e.g. from the network component, another mobile device, etc.). As another option, the network component may receive the information (e.g. from the mobile device).

[0042] In another embodiment, the information may be communicated by sending the information. Optionally, the mobile device may send the information (e.g. to the network component, to another mobile device, etc.). As another option, the network component may send the information (e.g. to the mobile device).

[0043] In yet another embodiment, the information may be communicated by displaying the information. For example, the information may be displayed on the mobile device, on the network device, etc. Such display of the information may be

accomplished using a graphical user interface presenting the information on a display screen of the mobile device, network device, etc.

[0044] As noted above, the information is communicated with the mobile device, based on the location. As an option, in one embodiment, the location may be the basis of communicating the information such that the information is only communicated with the mobile device as a result of a determination that the mobile device is present at the (e.g. predetermined) location. Thus, the information may optionally be communicated specifically with respect to the location at which the mobile device is present.

[0045] As another option, the location may be the basis of communicating the information such that the information is communicated based on a determination that the mobile device is present at the (e.g. predetermined) location. For example, the information may be communicated with an identification of the location at which the mobile device has been indicated as being present. Of course, however, the information may be communicated with the mobile device in any manner that is based on the location.

[0046] As a further option, the information may be communicated (e.g. with the mobile device) based on other factors. In various embodiments, such factor(s) may include a preference of a user of the mobile device, a profile of such user, a requirement of the information (e.g. as configured by a provider of the information), and/or any other parameter, data, etc. capable of being a basis for the communication of the information.

[0047] To this end, information is communicated with a mobile device, based on an identified location. In one embodiment, the mobile device, the network component, etc. may operate to identify the location (operation **302**) and communicate information with the mobile device based on the location (operation **304**). Thus, for example, a computer program product having code, which when executed by a processor, performs operations **302-304** may be resident on the mobile device, the network component, etc.

[0048] More illustrative information will now be set forth regarding various optional architectures and features with which the foregoing techniques discussed in the context of any of the present or previous figure(s) may or may not be implemented, per the desires of the user. For instance, various optional examples and/or options associated with the location identification of operation **302**, the information communication of operation **304**, and/or other optional features have been and will be set forth in the context of a variety of possible embodiments. It should be strongly noted, however, that such information is set forth for illustrative purposes and should not be construed as limiting in any manner. Any of such features may be optionally incorporated with or without the inclusion of other features described.

[0049] Figure **4** illustrates a method **400** providing a relevancy based trigger for a mobile device, in accordance with another embodiment. As an option, the method **400** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the method **400** may be carried out in any desired environment. Further, the aforementioned definitions may equally apply to the description below.

[0050] As shown in operation **402**, information and relevancy data is received at at least one mobile device.

[0051] While the information and relevancy data may be received from any device and/or network component, in accordance with one possible embodiment, the information and relevancy data may be received from at least one other mobile device. In such embodiment, the mobile devices may be any devices each having mobile communication capabilities such that the information may be received at the one mobile device from the other mobile device. As an option, the mobile devices may each be controlled by a user of a respective one of the mobile devices. In the present embodiment, the information may be received at the one mobile device directly from the other mobile device (i.e. without passing through an intermediary network component). With respect to such embodiment, the mobile devices may be in communication with each other to allow the one mobile device to directly receive the information from the other mobile device. For

example, the mobile devices may be in communication via a single network. Of course, the information may be received at the one mobile device indirectly from the other mobile device (i.e. by passing through at least one intermediary network component). With respect to such embodiment, the mobile devices may optionally only be in communication with each other indirectly to allow the one mobile device to indirectly receive the information from the other mobile device. For example, the mobile devices may be in communication via multiple networks (e.g. with the one mobile device located on one network and the other mobile device located on another network).

[0052] In another embodiment, the information may be received at the one mobile device from a broadcast of the information sent from any device (e.g. mobile device, network component, etc.). In another embodiment, the information may be received at the one mobile device via a message specifically targeting the one mobile device. Of course, however, the information may be received via any type of communication (e.g. any protocol, etc.).

[0053] Additionally, the information that is received at the one mobile device may be any type of information capable of being communicated between the mobile devices. For example, the information may be content, such as an advertisement, coupon, digital media, a message, etc.

[0054] Further, as shown in operation **404**, the information is conditionally acted upon with the at least one mobile device, based on the relevancy data. In the context of the present description, such action may include displaying, communicating (e.g. sending and/or receiving, etc.), storing, and/or any other act capable of being carried out, at least in part, by a mobile device. In the case of displaying, such display of the information may be accomplished using a graphical user interface presenting the information on a display screen of the mobile device, for example. In this way, the display may allow a user of the mobile device to view the information.

[0055] As noted above, the action on the information is conditional based on the relevancy data. Such relevancy data may include any data that is related to relevancy of

the information with respect to one or more mobile devices and/or users. For instance, such relevancy may be with respect to any criteria (e.g. aspect such as location, service, etc.) associated with the mobile device or user thereof. For example, only information determined to be relevant may be displayed with the mobile device receiving such information.

[0056] In one embodiment, the relevancy may be determined based on a location of the at least one mobile device. The location of the mobile device may be determined, for example, using a location identifying device (e.g. GPS) associated with the mobile device, querying a database for the location of the mobile device, etc. In addition, the information may be predetermined to be relevant to a location or multiple locations, such that the information may only be determined to be relevant, and thus acted upon with the mobile device, when the mobile device is located at the relevant location (or in the event of multiple specific locations, when the mobile device is located at one of the relevant locations).

[0057] In another embodiment, the relevancy may be determined based on a preference of a user of the mobile device. The preference may be determined from input of the user, a profile of the user, etc. Furthermore, the information may be predetermined to be relevant to a preference or multiple preferences. In this way, the information may be acted upon with the mobile device, when the preference of the user is a relevant preference (or in the case of multiple relevant preferences, is one of the relevant preferences).

[0058] While various examples of criteria that may be used for determining the relevancy of the information are described above, it should be noted that the criteria may be used in any desired manner to determine the relevancy of the information. For example, a valuation of the criteria may be used to determine the relevancy of the information (e.g. by comparing the same to a threshold, by applying a function thereto, etc.). As another example, a rule establishing (e.g. requirements of, etc.) relevancy may be applied to the criteria to determine the relevancy of the information.

[0059] To this end, information received at a mobile device from at least one other mobile device may be conditionally displayed with the one mobile device, based on a relevancy thereof. This may allow information to be communicated between mobile devices, where information received at one mobile device from another mobile device is only presented to a user of the one mobile device that received the information when the information is determined to be relevant.

[0060] More illustrative information will now be set forth regarding various optional architectures and features with which the foregoing techniques discussed in the context of any of the present or previous figure(s) may or may not be implemented, per the desires of the user. For instance, various optional examples and/or options associated with the information receipt of operation **402**, the information display of operation **404**, and/or other optional features have been and will be set forth in the context of a variety of possible embodiments. It should be strongly noted, however, that such information is set forth for illustrative purposes and should not be construed as limiting in any manner. Any of such features may be optionally incorporated with or without the inclusion of other features described.

[0061] Figure **5** illustrates a system **500** for location and/or relevancy based triggers for mobile devices, in accordance with yet another embodiment. As an option, the system **500** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the system **500** may be implemented in any desired environment. Again, the aforementioned definitions may equally apply to the description below.

[0062] As shown, one or more data/content providers **501** and one or more data/content aggregators **502** communicate with one or more mobile networks **506A-N**. As also shown, the data/content providers **501** and data/content aggregators **502** communicate via a broadband backhaul infrastructure **503** [e.g. using any desired protocol **504**, such as Internet Protocol (IP) over the broadband backhaul infrastructure **503**]. Thus, the data/content providers **501** and data/content aggregators **502** may be located on other networks (not shown) which are separate from, but in communication

with the mobile networks **506A-N** for indirect communication with the same via the broadband backhaul infrastructure **503**.

[0063] Of course, it should be noted that the broadband backhaul infrastructure **503** may be any platform, network(s) (such as the Internet), etc. enabling communication between each of the data/content providers **501** and data/content aggregators **502** with the mobile networks **506A-N**. It should also be noted that such mobile networks **506A-N** may be any networks establishing wireless communications between the various network components described herein. For example, the mobile networks **506A-N** may include WiFi hotspots (IEEE 802.11), Wimax (IEEE 802.16), ad hoc networks (based on 802.11 or 802.11 derivatives such as DSRC, cellular networks (2G: CDMA, GSM; 2.5G: GPRS, 1xRT, EDGE; 3G: CDMA-2000, WCDMA, UMTS; 4G: LTE).

[0064] In the present embodiment, the data/content providers **501** may be any network components capable of provisioning content over the mobile networks **506A-N**. For example, the data/content providers **501** may store the content for provisioning the same over the mobile networks **506A-N**. As another example, the data/content providers **501** may provision services for communicating the content over the mobile networks **506A-N**. Such content may be provisioned over the mobile networks **506A-N** to various mobile devices **504**, or any other network components, described below.

[0065] Also in the present embodiment, the data/content aggregators **502** may be any network components capable of receiving content over the mobile networks **506A-N**. For example, the data/content aggregators **502** may receive the content over the mobile networks **506A-N** for storing, aggregating, analyzing, forwarding, etc. such content. Optionally, the data/content aggregators **502** may receive the content from the various mobile devices **504**, or any other network components, described below.

[0001] As also shown, a location proxy server **505A-N** at each of the mobile networks **506A-N** is in communication with the data/content providers **501** and data/content aggregators **502** via the broadband backhaul infrastructure **503**. The location proxy servers **505A-N** may each be any network component that proxies communications

for a respective one of the mobile networks **506A-N**. In another embodiment (not shown), a single one of the location proxy servers **505A-N** may serve multiple of the mobile networks **506A-N**, and therefore provide data routing to and from the multiple of the mobile networks **506A-N**. In yet another embodiment (also not shown), the location proxy servers **505A-N** may be integrated with (i.e. not separate from) network specific gateways **507A-N** described below. For that matter, any of the components shown in the present Figure may or may not be integrated with any one or more of the remaining components.

[0002] The location proxy servers **505A-N** may be aware of location and/or place attributes of each of a plurality of network information outlets **508A-N**. For example, the location proxy servers **505A-N** may be in communication with one or more location databases **509** containing address tables that may be used by location proxy servers **505A-N** to allow a cross reference between the network addresses of the network information outlets **508A-N** and the location and/or place attributes of such network information outlets **508A-N**. Optionally, the location and place attributes of the network information outlets **508A-N** may be provided to the location databases **509** by the network information outlets **508A-N**, through a manual entry by a system administrator, or may be automatically acquired through manual or automated cross referencing of the location of the network information outlets **508A-N** and other geographic and business information. In another embodiment, such information may collected in connection with a subscription and/or registration process involving the network information outlets **508A-N** and/or any of the other components shown in the present Figure.

[0003] In addition, the location proxy servers **505A-N** may be in communication with one or more subscriber databases **510** containing information about the data/content aggregators **502** relating to service and location attributes of interest as specified by those data/content aggregators **502**. It should be noted that while shown separate, the location database(s) **509** may be integrated with each of the location proxy servers **505A-N**, or they may be remotely connected by way of a network, and/or they may be distributed across a plurality of sites.

[0004] Further, as shown, a network gateway **507A-N** is provided for each wireless network **506A-N**. The network gateways **507A-N** may be utilized to route information from the broadband backhaul infrastructure **503** to a specific mobile device **504** or to a group of mobile devices **504** within the respective mobile network **506A-N**. The network gateways **507A-N** may also optionally be integrated with the network information outlets **508A-N** and directly connected to the broadband backhaul infrastructure **503** or to an Internet service provider.

[0005] The network information outlets **508A-N**, which may also be referred to herein as network I/O units, may include for example Dedicated short-range communications (DSRC) roadside units (RSU) **508A** for a DSRC network **506A**, cellular towers **508B** for a cellular network **506B**, and WiFi hot spots **508N** for a WiFi Network **506N**. Each of the network information outlets **508A-N** may be fixed at a certain location, and each may be associated with at least a location attribute, and optionally additional place attributes.

[0006] The network information outlets **508A-N** may directly communicate with the mobile devices **504** over a wireless transceiver, and may be connected to an associated one of the network gateways **507A-N** via open or proprietary backhaul networks. It should be noted that the wireless networks **506A-N** may each be of any type that supports addressed and/or broadcast data communications. Thus, the mobile devices **504** may connect to one or more of the wireless networks **506A-N** using addressed and/or broadcast communications. In addition, a proprietary and/or open standard backhaul network may connect the network information outlets **508A-N** to the location proxy servers **505A-N**, by way of the network gateways **507A-N**.

[0007] In the present embodiment, the location proxy servers **505A-N** may abstract the knowledge of the specific wireless infrastructure, such that messages may be sent by the data/content providers **501** to locations (e.g. instead of specific network addresses), such that knowledge by the data/content providers **501** of the proprietary mobile networks **506A-N** or the locations of the network information outlets **508A-N** may optionally not be necessary. For example, the data/content providers **501** may send

content to a location, the location proxy servers **505A-N** may identify the addresses of network information outlets **508A-N** relevant to the location (e.g. by querying the location database(s) **509** for network information outlets **508A-N** having a location attribute, etc. matching the location), and may forward the content to those identified addresses of the relevant network information outlets **508A-N**, which may then forward the content to the mobile devices **504** connected thereto.

[0008] By using the above system **500**, physical configuration of the mobile networks **506A-N** can change without changing addressing to network information outlets **508A-N** and mobile devices **504**. In addition, the data/content providers **501** do not necessarily have not to know about any changes in the mobile networks **506A-N**. Furthermore, the data/content providers **501** and data/content aggregators **502** may optionally only need to know how to reach the location proxy servers **505A-N**. The data/content aggregators **502** may, in one embodiment and from their perspective, acquire information from a physical location without knowing the infrastructure of the mobile networks **506A-N**.

[0009] Moreover, messages can be directed by the data/content providers **501** to a location over multiple networks simultaneously, for example, where the location is business name capable of having a place of business at multiple different geographical points. In such example, multiple of the network information outlets **508A-N**, located at different physical locations, may have a location attribute matching the location to which the message is directed.

[0010] To this end, location and optionally service attributes may be used as the basis for message routing, using the system described above. In particular, the system **500** may resolve internal routing information based on location (e.g. coordinates, physical location, logical location, functional or commercial description, etc.) attributes of a network I/O unit, or mobile device(s) in local proximity of a network I/O unit **508A-N**, such that the sender **501** may send data to the mobile device **504** in proximity of the network I/O unit **508A-N** based only on the location attributes of the network I/O unit **508A-N** and the service attributes (e.g. type, preferences, authentication, etc.) of the mobile device **504**. In this way, the system **500** may resolve internal routing information based on the

location of the network I/O unit **508A-N**, such that the a user may receive data from mobile device(s) in proximity of the network I/O unit **508A-N** based only on the location attributes of the Network I/O unit **508A-N**, and the service attributes of the mobile device **504**.

[0011] Figure **6A** illustrates a system **600** for hierarchical information distribution and collection by region, in accordance with still yet another embodiment. As an option, the system **600** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). For example, the system **600** may be implemented with respect to the network components of Figure **5**. Of course, however, the system **600** may be implemented in any desired environment. Again, the aforementioned definitions may equally apply to the description below.

[0012] As shown, a main location proxy server **601** distributes information to different regions, each represented by a regional proxy server **602A-N**. Each regional proxy server **602A-N** distributes information to the appropriate network gateways **507A-N**. In the same way, the regional proxy servers **602A-N** forward information collected from the mobile devices **504** to the data/content aggregators **502** which are subscribers of the collected information, via the main location proxy server **601**.

[0013] Figure **6B** illustrates a system **650** for hierarchical information distribution and collection by network technology, in accordance with yet another embodiment. As an option, the system **650** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the system **650** may be implemented in any desired environment. Yet again, the aforementioned definitions may equally apply to the description below.

[0014] As shown, the main location proxy server **601** distributes information to the various network specific location proxy servers **505A-N**, as described above with respect to Figure **5**. However, as not shown in Figure **5**, the information is then distributed to different regions, each represented by a regional network gateway **603A-N**. In the same way, the regional network gateways **603A-N** forward information collected from the

mobile devices **504** to the network specific location proxy servers **505A-N**, and onto the data/content aggregators **502** which are subscribers of the collected information, via the main location proxy server **601**.

[0015] Figure **7** illustrates a message structure **700**, in accordance with another embodiment. As an option, the message structure **700** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the message structure **700** may be implemented in any desired environment. Yet again, the aforementioned definitions may equally apply to the description below.

[0016] The message structure **700** shown may include the structure of a message sent by a data/content provider (e.g. item **501** of Figure **5**) for delivery to a mobile device (e.g. item **504** of Figure **5**). The message structure **700** includes a message payload **1400** having content to be provisioned from the data/content provider. Such content payload **1400** may be text, media, etc.

[0017] The message structure **700** further includes an address header **701** which is a location proxy address header that designates the location proxy server (e.g. item **505A-N**) to which the message is to be sent. The message structure **700** also includes a location header **703** which addresses the payload message **701** to a specific location. Moreover, the message structure **700** includes a service header **704** which may describe a type of service to be used for transmitting the message, along with optional attributes relevant for service delivery. It should be noted that the location header and service header may be implemented such that they can be extended to provide a wide variety of different ways to encode or reference different types of location or service related information.

[0018] As an option, the payload **1400** may be encrypted, while the headers described above may be readable by proxies. In this way, messages can be routed to a destination without impacting the integrity of the end to end transaction. As a further option, the location header **703** (and/or the service header **704**) may be encrypted to protect from unauthorized sending of certain information to certain locations.

[0019] Figure **8** illustrates location header formats **800**, in accordance with yet another embodiment. As an option, the location header formats **800** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the location header formats **800** may be implemented in any desired environment. Still yet again, the aforementioned definitions may equally apply to the description below.

[0020] In the present embodiment, the location header **703** includes a location identifier **801** (e.g. road link ID, feature ID, attribute ID) which may optionally be used for cross-referencing a particular location. The location header **703** also includes a location type **802** (e.g. point, area, road link) indicating a type of the particular location (i.e. the location data format). Further, the location header **703** includes location data **803**, which may include a latitude value **804** and longitude value **805**, or other geographical coordinates. As a further option (not shown), the location header **703** may also include a timestamp.

[0021] It should be noted that the location headers may identify any desired locations, such as street addresses; street or road intersections; parking structures or lots; shopping centers, zones, or specific retail stores or outlets, including special sales at such locations; sports venues and or events; theme parks or theme park rides, concerts, or other theatrical or entertainment events, shows and expos such as auto shows, fairs, garden shows, home shows, pet shows etc.; and restaurants, including types of cuisine, food courts, etc.

[0022] By using the location header **703**, a sender or receiver of data may specify a location according to a variety of attributes that may correspond to that location such as place names, coordinates, road intersections, business names, landmarks and other such parameters or attributes. These other attributes may also include logical attributes associated with information collected from the location such that the location attributes of a particular physical location may change depending the attributes of devices present at the location. The corresponding locations may not necessarily be unique, but may correspond to a plurality of locations corresponding to the attributes defined by the sender or receiver, for example specifying the name of a retail outlet might cause data to

be sent to the locations of all such retail outlets, or collected from the locations of all such retail outlets.

[0023] Figure **9** illustrates location encoding formats **900**, in accordance with yet another embodiment. As an option, the location encoding formats **900** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the location encoding formats **900** may be implemented in any desired environment. Further, the aforementioned definitions may equally apply to the description below.

[0024] As shown, each location type indicated by a location type message header may have a different data formats. For example, a point may be encoded by referring to a latitude value **804** and longitude value **805**, or in other embodiments may refer to a landmark, a street address, an intersection of two roads, a mile-post and offset, etc.

[0025] A circular area may be encoded by referring to an origin latitude **901**, an origin longitude **902**, and a radius **903**. A roadlink may be encoded by referring to a road link identifier **904**, feature attributes **905** (e.g. an address number), a direction of travel **906**. A rectangular area may be encoded by referring to a latitude lower left corner value **907**, a longitude lower left corner value **908**, a latitude upper left corner value **909**, a longitude upper left corner value **910**.

[0026] Of course, in other embodiments, an area may be encoded by ZIP code, political borders such as county, state, or country, and by referring to road segments. It should be noted, of course, that the above formats are shown by way of example only, and that there are many other data formats that can be used to encode various location types. Just by way of example, the Geographic Data Format (GDF 3.0), a CEN and ISO standard for encoding location data is incorporated herein by reference. Other optional standards include the ISO 3166 specification, the OpenGIS KML 2.2 *Encoding Standard* (OGC KML), CityGML, POI XML, RDF™, SIF+, and IETF RFC1712 (http://www.faqs.org/rfcs/rfc1712.html). In addition, private vendor encoding standards, such as Navteq NN4D and NAVSTREETS® data format, may be used.

[0027] As a further option, locations may be encoded abstractly using business type references such as North American Industry Classification System (NAICS) codes, stock exchange symbols, or other identifying references. Such references may also be combined with other location references such as city, state or county to reference businesses of a particular type or brand within a given geographic or jurisdictional region.

[0028] In other embodiments, any of the techniques disclosed herein may be used in combination (with possibly others as well), in order to validate, refine and/or otherwise further identify a location.

[0029] Figure **10** illustrates a service header **1000**, in accordance with yet another embodiment. As an option, the service header **1000** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the service header **1000** may be implemented in any desired environment. Moreover, the aforementioned definitions may equally apply to the description below.

[0030] In the present embodiment, the service header **704** includes a service identifier **1001** and one or more service attributes **1002** associated with that service identifier **1001**. The service attributes **1002** consist of an attribute type **1003** and an associated attribute value **1004**. In the example shown, the urgency of the message may indicated by an urgency attribute **1003**, which may be encoded with a value **1004** of "HIGH."

[0031] Figure **11** illustrates service encoding formats **1100**, in accordance with still yet another embodiment. As an option, the service encoding formats **1100** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the service encoding formats **1100** may be implemented in any desired environment. Further, the aforementioned definitions may equally apply to the description below.

[0032] As shown, the service encoding formats **1100** include various service attributes may be included in a service header **704**. For example, the service attributes **1002** may include any information that is relevant for handling of the associated message

payload by a receiving device (e.g. mobile device). In one embodiment, the service header information may include preference information established by the user of the receiving device so that messages may be filtered according to the user's preferences (e.g. needs, interests, etc.).

[0033] Just by way of example, such service header information may include user preferences as service attributes for the transmission or reception of location addressed data. As another example, the service header information may be acquired from other devices or sources associated with the user, such as personal devices, or personally associated web sites such as MySpace, FaceBook, LinkedIn, etc., or may be set by the user either through a device user interface, or remotely through another interface that can communicate with the mobile device of the user.

[0034] In the examples shown, the service attributes **1002** a service type attribute **1101**, and attribute parameters **1102** for that service type attribute **1101**. For service attributes **1002** having a secured service type attribute **1101**, such service attributes **1002** may also include authentication information **1103**. In the first example, where the service type attribute **1101** is "Collection," indicating that the message is for data collection purposes (i.e. by a data/content aggregator), the attribute parameters **1102** include data types, user profiles, etc. to be used in determining a relevancy of the associated message to the receiving device.

[0035] In the second example, the service type attribute **1101** is "Distribution," indicating that the message is for data distribution purposes (i.e. to a mobile device), and the attribute parameters **1102** include preferences, profiles, relationships, memberships, etc. associated with the user of the receiving device to be used in determining a relevancy of the associated message to the receiving device.

[0036] In the third example, the service type attribute **1101** is "Secured Collection," indicating that the message is for secure data collection purposes (i.e. by an authenticated data/content aggregator). The attribute parameters **1102** include a preference attribute list to be used in determining a relevancy of the associated message to the receiving device,

and the authentication information **1103** is further included for authenticating the receiving device.

[0037] In the fourth example, the service type attribute **1101** is "Secured Distribution," indicating that the message is for secure data distribution purposes (i.e. to an authenticated mobile device). The attribute parameters **1102** include a preference attribute list to be used in determining a relevancy of the associated message to the receiving device, and the authentication information **1103** is further included for authenticating the receiving device.

[0038] Thus, the information included in the service attributes **1002** may include various authorizations so that, for example, only users with approved credentials may receive certain broadcast messages. These authorizations may be implemented in multiple ways.

[0039] For example, a general broadcast to a local area regarding a person in that area in need of medical attention may be encrypted using the service attributes **1002** format described above, such that only mobile device users with appropriate training can decrypt the message and thereby be notified of the need should they choose to provide assistance. Such authorization may involve use of a digital key provided to the user based on a certification, or the mobile device may be instructed to contact a clearing center to provide specific information prior to be sent a decryption key. In this way, access rights may be assigned, provided and validated to assure that a sender has authorization to send data of a specified type to or from a specified location, and/or that a receiver has authorization to receive data of a specified type at or from a specified location.

[0040] In other (e.g. less critical) situations, the service attributes **1002** may include, for example, membership information so that messages relevant to specific membership levels can be targeted only at members of that level. This may allow information or instruction messages to be issued, for example, at an airport directing elite mileage club members to one place, while directing other level members to another. The same service attributes **1002** format may be used, for example in a shopping mall, where messages are

filtered on reception by comparing the service attributes **1002** to the user profile data in the mobile device. Accordingly, messages targeted at teens may be received by mobile devices belonging to teens, while elderly shoppers might receive messages targeted to their specific needs or interests.

[0041] In still other embodiments, the service attributes **1002** may also include any attribute, characteristic, I/O value, etc. associated with a targeted device. Just by way of example, the service attributes **1002** may indicate a particular hardware and/or software aspect (e.g. characteristic, threshold, minimum value, etc.) to indicate which type of devices are the intended recipient of a message. For instance, such hardware and/or software aspect may include a minimum memory and/or processing capacity, a minimum operation system version, a list of one or more software applications that are required to be installed [e.g. browser, communication (e.g. email, instant message, etc.) platform, etc.], a list of one or more I/O capabilities (e.g. a minimum screen size, an existence of a particular I/O mechanism such as a camera, accelerometer, GPS, touch screen, etc.).

[0042] In other embodiments, the hardware and/or software aspect may be those that fluctuate over time. For instance, the hardware and/or software aspect may include remaining battery power or life, type and/or number (0, 1, 2, etc.) of open applications or applications currently-in-use, state of device (e.g. power-save mode, awake, phone call active, navigation system currently in use, data plan criteria (e.g. under/over budget, etc.), etc. As further examples, the service attributes **1002** may also include a direction of travel (e.g. moving toward and/or away a predetermined location, etc.), a type and/or speed of travel (e.g. moving or not, moving at a predetermined speed, any movement profile that indicates driving and/or walking activity, etc.). To this end, one may be able to ensure that the hardware and/or software is sufficient and/or more suited for a delivery and/or receipt of a particular message payload.

[0043] In still additional embodiments, the service attributes **1002** may involve application-related aspects (e.g. states, criteria, usage, parameters, etc.). For example, the service attributes **1002** may indicate a threshold, prevalence, type, etc. of use of a particular application (e.g. user of device has taken more than 100 pictures with a camera

application, user of device regularly uses communication platform application, user of device has used a network browser at least once in past (thus indicating that he/she knows how), user currently has the network browser open, etc. In another example, specific application information may be specified. For example, the service attributes **1002** may specify that a calendar application indicate that the user of the device is "free" (i.e. has no scheduled activity, etc.) at a current time and/or at a prescribed time/timeframe, etc. As an option, any of the aforementioned information may or may not be accessible via an application-specific and/or standard application program interface.

[0044] In other embodiments, the aforementioned service attribute parameters may include other device-independent and/or user-independent and/or location-independent parameters. For example, such attribute parameters may include weather parameters (e.g. requirement of no rain or snow, minimum or maximum temperature, etc.), time parameters [e.g. business hours for a particular region, time of day and/or year, requirement of daylight (which may vary based on time of year), school hours (which may vary based on time of year), stock market activity, etc.

[0045] In even other embodiments, the service attributes may include criteria that involves a plurality of devices and/or users. For example, the service attributes may specify a threshold number of devices and/or users, a threshold number of devices and/or users in proximity to a predetermined location, a type of relationship between devices and/or users, etc. Such relationship may be a "friend" relationship, for example, as defined by a social networking site. For instance, the service attributes may indicate a threshold number of social network site members who have "checked-in" together.

[0046] Optionally, other user profile information may be included with any service attributes. For example, the service attributes may, in one embodiment, include purchase history, credit rating, Internet browsing activity (e.g. tracked by cookies or a social networking site, etc.). Further, other profile information may include gender, age, education, etc.

[0047] In still other embodiments, the service attributes may indicate criteria that is relevant to a receipt/display of, interaction with, etc. a particular message(s) and/or previous message(s). Just by way of example, the service attributes may indicate that a new message is to be distributed to only those locations/devices/persons that were in receipt of a previous message.

[0048] In some embodiments, any of the foregoing location/service attributes and/or parameters may be used as device software/hardware/users profiles for allowing a sender of messages to define a target audience/device. In other embodiments in addition or lieu of the foregoing, any of the above described attributes and/or parameters may be used as preferences for allowing a receiver of messages to control content receipt and/or display. It should also be noted that, in various optional embodiments, any of the foregoing attributes and/or parameters may be used by any one or more of a plurality of network components (e.g. any of the network components of Figure **5**, for example) and/or users/administrators thereof, for the purpose of controlling such distribution of messages, receipt of messages, and/or display of messages. Of course, it is also contemplated that any combination of any of the foregoing attributes and/or parameters may be utilized in such manner.

[0049] Figure **12** illustrates a system **1200** including a location proxy server, in accordance with another embodiment. As an option, the system **1200** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the system **1200** may be implemented in any desired environment. Further, the aforementioned definitions may equally apply to the description below.

[0050] The location proxy server **505** may use a microprocessor **1201** to execute software **1202**. The microprocessor **1201** has access to non-volatile memory **1203** and volatile memory **1204** for storing the software **1202** and providing storage for program data and communication caching. The location proxy server **505** may be further connected to one or more communication networks **503** using one or more network interfaces **1206**. The location proxy server **505** may further have a real-time clock **1205**

to process messages based on attributes indicated by headers included in such messages, such as headers storing time stamps, urgency information, etc.

[0051] The software **1202** may provide efficient routing of messages from data/content providers to mobile devices and/or from mobile devices to data aggregators, for example, as described in more detail below.

[0052] Figure **13** illustrates a method **1300** for data distribution, in accordance with another embodiment. As an option, the method **1300** may be carried out in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the method **1300** may be carried out in any desired environment. Again, the aforementioned definitions may equally apply to the description below.

[0053] As shown in operation **1301**, a data/content provider creates a payload message to be distributed to mobile devices at a certain location. In order to provide the message to only valid (e.g. specific, relevant, etc.) devices, a service header is added to the message to describe the type of service and any attributes relevant for service delivery (operation **1302**).

[0054] In operation **1303**, the data/content provider adds a location header and location proxy address header to this message. The location header includes the location type (e.g. point, area, road link), encoded location data (e.g. latitude / longitude, x-y, or other geographical coordinates) and/or additional parameters (e.g. road link ID, feature ID, attribute ID) to address the payload message to a certain location.

[0055] As mentioned earlier, any location/service attributes and/or parameters may be used in connection with the foregoing operations. For example, see the non-limiting examples described in connection with Figures **7-11**. To this end, the data/content provider may further refine a target audience/device for the message payload.

[0056] In operation **1304**, the data/content provider sends the message to the appropriate location proxy server, which may be addressed by using a TCP/IP or UDP/IP

address header, or any other networking address header for that matter. In operation **1305**, the location proxy server receives the message via network from the data/content provider and extracts the location header along with the service header and payload message.

[0057] In operation **1306**, the location proxy server examines the headers, and using information in a location database, determines the network addresses of the relevant network I/O units based on the location encoded information in the location header and service attributes in service header. The location proxy server uses the determined network addressing information to forward the message to the network I/O units determined to be relevant via a network gateway and associated communication link of the mobile networks associated with such network I/O units (operation **1307**).

[0058] In operation **1308a**, each of the network I/O units receiving the message broadcasts the message to all local mobile devices in its communication range. As an alternative to operation **1308a**, each of the network I/O units may send the message individually to the current network addresses of mobile devices known to be in communications range of the network I/O unit.

[0059] As an option, in various embodiments, any of the aforementioned location/service attributes and/or parameters may be used in connection with any of operations **1305-1308a/b** to direct the message to an appropriate target audience/device. Again, see, for example, the non-limiting examples described in connection with Figures **7-11**.

[0060] Furthermore, in operation **1309**, a mobile device to which the message is broadcasted/addressed receives the message from the network I/O unit by which the message was sent. The mobile device performs actions based on the message payload and/or headers included in the message (operation **1310**). As shown in operations **1311a-1311e**, such actions may include any of (and in any order): displaying of certain elements of the payload message, for example, in the form of text, images or video (operation **1311a**); generating audio information related to or derived from the message content

(operation **1311b**); producing of other types of user interface signals usable by the mobile device or its peripheral devices or interfaces (operation **1311c**); generating and transmitting another message having headers related to, but not necessarily the same as, the received message (operation **1311d**); and controlling one or more device application functions based on the information in the message headers (operation **1311e**).

[0061] Examples of such device application functions include requesting additional device specific information from the network I/O unit from which the message was received, such as security information; decrypting received content, holding the message until some other criteria is met (for example the location of the mobile device is within a geographic region specified in the message, or a specific time elapses, etc.), and then talking one or more of the actions described in operations **1311a-1311d**, etc. Such actions may also include comparison of the message headers and or payload to stored user preferences to determine the appropriate actions, which may optionally include taking no action.

[0062] In some embodiments, any of the aforementioned location/service attributes and/or parameters (e.g. see non-limiting examples described in connection with Figures **7-11**, etc.) may be used in connection with any of operations **1310-1311a/b/c/d/e** to direct the message to an appropriate target audience/device and/or to allow a receiver (device and/or user) of messages to control content receipt and/or display. Specifically, any one or more of operations **1310-1311a/b/c/d/e** may conditionally occur based on the aforementioned location/service attributes and/or parameters.

[0063] Of course, it is contemplated that the aforementioned use of location/service attributes and/or parameters may or may not be: exclusively on the part of the data/content provider (e.g. via target device/user profiling, etc.), exclusively on the part of the user (e.g. via preference setting, etc.), and/or any combination thereof. Just by way of example, in one embodiment, any one or more of operations **1301-1308a** may be exclusively based on the location attributes and/or parameters, such that a large set (e.g. all, nearly all, etc.) of devices/users at a predetermined location are capable of receiving the message. Further, again in the context of the above example, the devices/users may

be exclusively based on the service attributes and/or parameters, such that only a focused subset (e.g. a small fraction, etc.) of the large set of devices/users at the predetermined location act on the message via any one or more of operations **1310-1311a/b/c/d/e**. Again, as mentioned earlier, other embodiments are contemplated whereby the service attributes and/or parameters may be utilized in connection with any one or more of operations **1301-1308a**, the location attributes and/or parameters may be utilized in connection with any one or more of operations **1310-1311a/b/c/d/e**, any mixture thereof, etc.

[0064] Thus, the data/content provider may send data to a particular physical location such that network devices in that location can receive such data only as a result of their physical presence at that location and the device preferences or authorizations (i.e. service attributes). The provider of such data may describe a location tolerance or range such that mobile devices within that range may receive such data, but mobile devices outside that range may not. Still yet, users receiving such data may not necessarily need to identify themselves to any elements of the mobile network, and they may not necessarily require any form of network identity or address in order to receive such data. Further, the users may further control any aspect (e.g. how, what, when, where, etc.) of such message communication, as desired, via preference setting or the like. Still yet, as an option, various types of authorization and validation may be provided allow a data/content provider to securely send information to mobile devices within the area corresponding to the specified location attributes that are also authorized to receive such data.

[0065] Figure **14** illustrates a method **1400** for data collection, in accordance with another embodiment. As an option, the method **1400** may be carried out in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the method **1400** may be carried out in any desired environment. Again, the aforementioned definitions may equally apply to the description below.

[0066] As shown in operation **1401**, a mobile device sends a message to local network I/O units (i.e. network I/O units with which the mobile device is on communication). In an alternative embodiment (not shown), the mobile device may also broadcast the information to other mobile devices in the same local network or available through ad-hoc networking. In yet another embodiment, the mobile device may use a positioning system such as GPS and or a digital map to determine its location and add the location type (e.g. point, area, road link), location data, (e.g. latitude / longitude, x-y, or other geographical coordinates) and as well as additional parameters (e.g. road link ID) to headers of such message.

[0067] As shown in operations **1402a-1402f**, the mobile device may generate such message on the basis of a variety of events, such as: a request by the network I/O unit (operation **1402a**); being located within a specified geographic region (operation **1402b**); being located within a particular place identified by a name, encoded name number or symbol or other place attribute (operation **1402c**); a time of day, or time elapsed since a last message transmission (operation **1402d**); accumulated data associated with a parameter associated with the mobile device reaching a pre-determined threshold, such as 1uantity, value, event, etc. (operation **1402e**, where the parameters associated with mobile device may include operating parameters for the mobile device or the user, or a vehicle in which the mobile device is either embedded, connected or being carried, etc.); and reception of a data trigger message from another mobile device or from a device located in proximity to, or integrated with the network I/O unit (operation **1402f**).

[0068] As an option, in various embodiments, any of the location/service attributes and/or parameters disclosed herein (e.g. see non-limiting examples described in connection with Figures **7-11**, etc.) may be used in connection with any one or more of operations **1401-1402a/b/c/d/e/f** to conditionally trigger the same. In various embodiments, such location/service attributes and/or parameters may be used to trigger the sending of predetermined and/or requested information. Such triggering may be in response to a request message, preconfigured settings in association with the device, and/or any other mechanism.

[0069] Still yet, in addition or lieu of the aforementioned conditional triggering, any of the location/service attributes and/or parameters disclosed herein (e.g. see non-limiting examples described in connection with Figures **7-11**, etc.) may be used to dictate a content of a message. Of course, in other embodiments, any other aspect of the message (e.g. header information, destination information, message trigger criteria, etc.) may be based on the location/service attributes and/or parameters.

[0070] In operation **1403**, the network I/O unit receives the message from the mobile device and adds its location information to the message. In operation **1404**, the network I/O unit sends the message via a network gateway included in the associated mobile network to a location proxy server. It should be noted that the network I/O unit may also aggregate a plurality of messages received either from a single mobile device or from multiple mobile devices, and send the aggregated messages as a single aggregate message to the location proxy server.

[0071] In operation **1405**, the location proxy server receives the message sent by the network I/O unit, and in operation **1406** the location proxy server examines the headers of the message and using a data/content aggregator subscriber database, determines the addresses of relevant data aggregators based on such data aggregators subscription to location encoded information included in the message headers.

[0072] In operation **1407**, the location proxy server distributes the received messages to the appropriate data aggregators (e.g. via a backhaul connection). It should be noted that depending on the contents of location subscriber database, the location proxy server may distribute all messages with the specified location and content information to a data/content aggregator or it may distribute portions of those messages. In operation **1408**, the data/content aggregators receive the messages for further processing.

[0073] In a variety of embodiments, any of the location/service attributes and/or parameters disclosed herein (e.g. see non-limiting examples described in connection with Figures **7-11**, etc.) may be used in connection with any one or more of operations **1403-**

1408 to govern whether (and, if so, a manner in which) messages are routed and/or to where. Of course, like every feature disclosed herein, such technique is optional.

[0074] To this end, data aggregator may receive data sent from any mobile devices located at a location specified by the data aggregator that are sending data. Such a data aggregator may specify a tolerance or range such that it will receive data sent by mobile devices within that location range or area, and optionally not from mobile devices not within the specified area. In addition, users sending such data may not necessarily identify themselves to any elements of the mobile network with which they are associated, and they may not require any form of network identity or address in order to send such data. Various types of authorization and validation may be provided to allow a data aggregator to securely receive information from mobile devices within the area corresponding to the specified location attributes that are also authorized to send such data.

[0075] Figure **15** illustrates a method **1500** for data re-broadcasting, in accordance with another embodiment. As an option, the method **1500** may be carried out in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the method **1500** may be carried out in any desired environment. Yet again, the aforementioned definitions may equally apply to the description below.

[0076] Assuming a mobile device has received and acted on a message generated by a data/content provider, for example, as described in connection with Figure **13** (e.g. received and displayed the message), the mobile device may further distribute such received message. Such distribution may optionally be independent of a network I/O unit, as described below with reference to the method **1500** of Figure **15**.

[0077] In operation **1501**, a mobile device waits to receive a message. When the mobile device receives a message broadcast from, or sent by, a network I/O unit or other mobile device (e.g. within wireless radio range of the receiving mobile device), as shown

in operations **1502a-1502b**, the mobile device examines headers and/or a payload of the message and determines that the message is designated for re-broadcast (operation **1503**).

[0078] As an option, in various embodiments, any of the location/service attributes and/or parameters disclosed herein (e.g. see non-limiting examples described in connection with Figures **7-11**, etc.) may be used in connection with any one or more of operations **1501-1503** to conditionally trigger any re-broadcasting. Still yet, in addition or lieu of the aforementioned conditional triggering, any of the location/service attributes and/or parameters disclosed herein may be used to dictate a content of a re-broadcasted message. Of course, in other embodiments, any other aspect of the re-broadcast (e.g. see decisions below, etc.) may be based on the location/service attributes and/or parameters.

[0079] As shown in decision **1504**, the mobile device compares the headers and/or payload to a list of cancelled re-broadcast messages received at some earlier time, such that if the message has been cancelled, the mobile device deletes the received message, and returns to operation **1501**.

[0080] Otherwise, as shown in operation **1505**, the mobile device generates a random number (e.g. between -200 and +200) and adds this (i.e. local repeat interval value) to re-broadcast repeat interval information contained in the service header of the message, for example, as measured in milliseconds. It should be noted that the value of the random number added to the re-broadcast repeat interval may depend on the type of network on which the mobile device is located, and that other values may be used to optimize performance based on the transmission and message processing time of the mobile network and the mobile device.

[0081] Furthermore, the mobile device compares the local repeat interval to the time elapsed since it last received the same message or transmitted the same message, and determines in decision **1506** whether the local repeat interval has elapsed. If the time elapsed since receiving or transmitting the message is less than the re-broadcast repeat interval, the mobile device returns to decision **1504** (e.g. it waits for the local repeat interval to expire).

[0082] If the time elapsed since receiving or transmitting the message is equal to or greater than the re-broadcast repeat interval, the mobile device compares message and/or payload to any messages received since the subject message was received, and it is determined in decision **1507** whether any received messages are the same as the subject message. If any of the received messages are the same as the subject message, the mobile device returns to operation **1504**. Otherwise, if no received messages are the same as the subject message, then the mobile device compares the re-broadcast time expiry information contained in the Service Header to the current time and determines in decision **1508** whether the re-broadcast expiry time is after the current time.

[0083] If the re-broadcast expiry time is not after the current time, the message is deleted and operation returns to operation **1501**. If the re-broadcast expiry time is after the current time, the mobile device compares the re-broadcast region information contained in the location to its current location and determines in decision **1509** whether the it is inside the re-broadcast region. It should be noted that the re-broadcast region may optionally be geographically separate from the reception region in the vicinity of the network I/O unit with which the mobile device is in communication.

[0084] If the mobile device is not inside the re-broadcast region, it returns to operation **1504**. Otherwise, if the mobile device is inside the re-broadcast region, the mobile device broadcasts the message (operation **1510**) and returns to operation **1504**. To this end, the method **1500** may cause messages to be re-transmitted by mobile devices to other mobile devices within radio range at regularly specified intervals within the re-broadcast region. If the message has been re-broadcast by another mobile device, then all mobile devices receiving such broadcast will reset their re-broadcast timers and continue to wait. If the mobile devices receive a cancellation message, or if the message expires, then they will exit the method **1500** for that message. If the mobile device is not within the re-broadcast region, then it may hold the message until it is cancelled, or it expires, or until the mobile device re-enters the re-broadcast region.

[0085] If the message is not expired or cancelled, and the mobile device is inside the re-broadcast region, then when the local repeat interval expires it may re-transmit the

message. In this way, the message may continue to be broadcast and spread geographically throughout the re-broadcast region as long as mobile devices are present. In one embodiment, if the broadcast region surrounding network I/O units is not the same as the re-broadcast region, this method **1500** may cause the effective broadcast region for the message to be the geographic union of both regions, or may cause the message to be broadcast in two distinct regions, one in the vicinity of the network I/O units, and one at another defined location where there is not necessarily a network I/O unit.

[0086] In one embodiment, the range of the network I/O units be such that a mobile device in any given location may be able to communicate with multiple network I/O units, and that such a situation may require additional processing to detect duplicate messages received from two or more network I/O units. Similarly, the broadcast of data from a mobile device in any given location may be received by multiple network I/O units, and that the location proxy server or the data aggregator may require additional processing to eliminate duplicate messages.

[0087] In another embodiment, the mobile device may identify the closest network I/O unit using, for example, the location of the network I/O unit as included in or appended to the message by the network I/O unit and compared to the location of the mobile device as determined using global positioning system (GPS), time difference of arrival (TDOA), angle of arrival (AOA), received signal strength measurements or other positioning schemes. Such positioning schemes may be independent of the network I/O units (e.g. self contained in the mobile device) or they may be cooperative, wherein the stationary network I/O units each measure signal strength of each other and/or the mobile devices, and provide information to the mobile devices to aid in determining the relative position of the mobile device to the network I/O units.

[0088] To this end, mobile devices receiving a message in the vicinity of any of the network I/O units, on the basis of their direction of travel and/or proximity to the specified destination location, may re-broadcast this data to other mobile devices at other locations. In this embodiment, a message communicated in this way may flood the region between the network I/O units and the location identified by the location parameters by

being passed from mobile unit to mobile unit until the message is transmitted in the vicinity of the destination location. Thus, the re-broadcast of the message may be managed, as described above, to prevent unnecessary re-broadcasting in areas where there are multiple mobile devices, and may prevent the propagation of the message in directions away from the intended destination, and to limit the overall geographic spread of message re-broadcasting. Further, as noted above, the message may be deleted after a specified period of time has elapsed, or if the mobile device moves sufficiently far away from the specified location. Still yet, an "anti-message" may be sent such that, when received by a mobile device, will terminate the re-broadcast and/or validity of a previously received message subject to such re-broadcasting.

[0089] Figure **16** illustrates an attribute interface **1600**, in accordance with another embodiment. As an option, the attribute interface **1600** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the attribute interface **1600** may be carried out in any desired environment. Again, the aforementioned definitions may equally apply to the description below.

[0090] The attribute interface **1600** allows a user to configure location attributes (and/or any other attributes, for that matter). For example, a data/content provider may configure the location attributes for associating the same with a message (e.g. including the location attributes in a header of the message, etc.), such that a location to which the message is relevant may be specified. As another example, a data/content distributor may configure the location attributes for defining the locations of mobile devices from which information is to be gathered.

[0091] As shown, the location attributes may be defined as physical locations (e.g. address, coordinates, region, etc.), category locations (e.g. retail outlet, event, venue, etc.), named locations (e.g. brands/trademarks, historical, registered under a particular name, etc.), logical locations (e.g. conditional/combinatorial, etc.), personal locations (e.g. people, groups, personal places, etc.), saved locations (e.g. previous locations, etc.), etc.

[0092] In the non-limiting embodiment shown, the physical location attributes may be configured by location type in a number of ways. For example, a specific address (or group of addresses) may be provided to input the location after a selection of an address option (as shown) of the attribute interface **1600**. In another embodiment, a region (e.g. continent, country, state, county, city, town, etc.) may be input after a selection of a region option (as shown) of the attribute interface **1600**. In still another embodiment, a line or zone may be defined in response to a selection of a respective geoline or geozone option of the attribute interface **1600**.

[0093] In an example where the location type option selected includes a zone or "geozone," an interface portion like that shown may be provided. For instance, as shown, a plurality of latitude/longitude pairs may be entered to define a plurality of vertices which, in turn encompass an area that is desired to be a locational target of one or more messages. As shown, options may be provided for allowing a user to add more vertices as needed, for providing a desired amount of granularity. As further shown, a map option may be provided for allowing a user to simply mark-up a map which, in turn, may allow code to automatically generate the vertices (or other location-defining information), to accomplish the same. Strictly as an option, such vertices may be required to define a closed region.

[0094] The attribute interface **1600** may also allow a user to activate and configure service attributes, such as profiles associated with mobile devices/associated users from which information is collected and/or profiles associated with the mobile devices associated users to which information is distributed. The profiles may include demographic information, preference information, any of those shown in the attribute interface **1600** (or others that are not shown). As further shown in the attribute interface **1600**, any location-based collection action may be further refined by selecting an option to define additional attributes (e.g. via user configuration and/or selection of predetermined attributes including, but not limited to the non-limiting examples described in connection with Figures **7-11**, etc.).

[0095] As an additional option, the attribute interface **1600** may provide for selection/configuration of location-based actions in any desired manner [e.g. in response to a selection of an activate option (as shown)]. For example, as illustrated, a field may be provided for allowing a user to select information [e.g. via a text entry of a pointer (as shown), a browse files menu option, etc.]. Such information may, for example, be constructed utilizing a separate interface or preconfigured, etc. in the form of messages ready for delivery in a manner dictated by the attribute interface **1600**.

[0096] As further shown, delivery condition options may be provided in connection with the attribute interface **1600** to, for example, further refine a target audience by selection/configuration of any desired attributes (e.g. the non-limiting examples described in connection with Figures **7-11**, etc.). For instance, as shown, an option may be provided to refine an intended audience to include a predetermined number of users of a predetermined gender with a certain selected age range who include certain selected preferences. Of course, other icons [e.g. an add icon (as shown), etc.] may be provided to augment the delivery options, as desired.

[0097] It should be noted that, in various embodiments, any of the location/service attributes and/or parameters disclosed herein (e.g. see non-limiting examples described in connection with Figures **7-11**, etc.) may be used in connection with the attribute interface **1600** as selectable/configurable attributes in the context of any of the examples set forth hereinabove (or others). Further, it should be noted that the attribute interface **1600** (and any other interfaces disclosed herein) may be implemented in any desired manner including, but not limited to web-based interfaces, client application interfaces, etc.

[0098] In one embodiment, the attribute interface **1600** may be a component of an advertisement interface that allows content providers, advertisers, etc. to control the sending, display, etc. of messages that include advertisements. In such embodiment, an advertisement generation interface(s) (not shown) may be included for allowing such content providers, advertisers, etc. to generate advertisements for inclusion with the messages. Still yet, an advertisement analytics interface (also not shown) may be included for allowing the content providers, advertisers, etc. to run "what-if scenario"

tests to determine a scope of devices/users would receive messages (including advertisements) given a variety of different attribute selections. This may be delivered in the form of statistics and/or any other techniques. Even still, such advertisement analytics interface may also be configured to track statistics with respect to message delivery. Of course, such analytics may also be based, at least in part, on data collected from locations using techniques described in association with Figure **14**.

[0099] In other embodiments, the attribute interface **1600** may be a component of a social networking site, for allowing administrators and/or users to focus delivery or collection of data. In still other embodiments, the attribute interface **1600** may be a component of a governmental framework for providing emergency information. Of course, the attribute interface **1600** may be a component of any desired framework where location/service-based message delivery/collection/display is desired.

[00100] Figure **17** illustrates a method **1700** for configuration of compound locations for information distribution using information collection, in accordance with yet another embodiment. As an option, the method **1700** may be carried out in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the method **1700** may be carried out in any desired environment. Again, the aforementioned definitions may equally apply to the description below.

[00101] It should be noted that the present method **1700** may be performed using a user interface capable of being used for configuring attributes (e.g. location/service including, but not limited to the examples described in connection with Figures **7-11**, etc.) that may be associated with message delivery. Just by way of example, such user interface may be attribute interface **1600** described above with respect to Figure **16**, but use of others is contemplated.

[00102] As shown in operation **1701**, a type of location definition is selected. For example, the type may be selected from physical locations, category locations, named locations, logical locations, personal locations, saved locations, etc. Location attributes for the selected location type are then set, as shown in operation **1702**. The location

attributes (e.g. coordinates, brands, etc.) may be specific to the location type, for example, as described above with reference to Figure **16**.

[00103] In operation **1703**, information to be delivered is selected. The information may be any content desired to be delivered to mobile devices, for example. Further, it is determined whether the delivery is to be conditional (decision **1704**). In one embodiment, this may include determining whether a user has selected an option that the delivery of the information be conditioned on one or more service attributes.

[00104] If it is determined that the delivery is not to be conditional, service header information is determined for the information (operation **1710**) and the information is distributed (operation **1711**). For example, the information may be distributed as described above with respect to Figure **13**, but other techniques are contemplated, as well.

[00105] Returning to decision **1704**, if it is determined that the delivery is to be conditional, it is further determined in decision **1705** whether a collection is defined. The collection may be profile data that is desired to be collected (e.g. to be used as a basis for targeting mobile devices/associated users having such profile data when distributing the message). If it is determined that a collection is not defined, collection attributes are set (operation **1706**). If it is determined that a collection is defined, or once the collection attributes are set, delivery conditions are defined, as shown in operation **1707**. The delivery conditions may indicate the conditions under which the message is to be delivered.

[00106] Further, data is collected, as shown in operation **1708** (e.g. via the defined collection), and it is determined in decision **1709** whether the delivery conditions are met. If it is determined that the delivery conditions are not met, further data is collected. Once it is determined that the delivery conditions are met, service header information is determined for the message (operation **1710**) and the message, having the location attributes, service headers, and selected information, is distributed accordingly.

[00107] Just by way of example, a data/content provider might configure the attributes to target a specialized message (e.g. advertisement, offer, coupon, etc.) to all registered

users who are within 200 meters of any location of a particular brand of retail outlet. As a further example, the data/content provider might, through a location based data collection process, use the presence of females between 21 and 25 years old who list a particular style preference, and are within 200 meters of any location of a particular brand of retail outlet as the basis for then delivering a message to mobile devices associated with those specified people (e.g. advertisement, offer, coupon, etc.). Such preferences may be determined through a registration process (for example signing up for this service), or through other mechanisms such as selecting or opting in to the service from a social media service such as Pinterest, Facebook, Google Groups, etc., or via an opt-in process as part of a club or other membership/registration process. Such registrations may be physical or online.

[00108] In yet another example, the aforementioned method **1700** may also be used by individuals. Optionally, a user might subscribe to a social service that will use the location data collection process to determine what other service members are within a specified distance, and then use the data distribution process to notify one or more of those members about the presence of others. Such a service might, for example, be used to notify a member of a dating site that another member that meets the user's specified attribute profile(s) is in the same bar or other venue. Such a service might also include the ability to control the delivery of such messages by each recipient.

[00109] As a further option, an event may be triggered when another person or persons were located at a particular place. For example, a parent could set a trigger that was activated when one or more of their children were at a specific location, possibly at a specific time (e.g. home from school, or at after school sports practice or tutoring venues). Similarly, friends may be notified when they arrive at the same location.

[00110] Figure **18** illustrates various user information delivery interfaces **1800**, in accordance with still yet another embodiment. As an option, the interfaces **1800** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the interfaces **1800** may be carried

out in any desired environment. Again, the aforementioned definitions may equally apply to the description below.

[00111] The user information delivery interfaces **1800** shown are examples of the messages that may be delivered to device devices by data/content providers. For example, the messages may include location based information which is only distributed to mobile devices associated with a relevant location and/or additional relevancy attributes.

[00112] As shown in Figure **18**, a notification of a store sale may be delivered to a target audience who are most likely to be interested in such sale and/or have an ability to access the store. Further, event information may be delivered to users who are most likely to be interested in attending the same and/or have a capability of doing so. Even still, an emergency alert may be sent to users who are most likely to be affected by an emergency or dangerous condition. Even still, users may be presented with messages including advertisements (and/or other inquiries, surveys, etc.) that allow for feedback in the form of a response (e.g. "No Thanks," "Yes," "Like," etc.). As an option, such feedback may be considered an "attribute" for use in subsequent data collection/delivery/display, etc.

[00113] Figure **19** illustrates an automotive system **1900**, in accordance with another embodiment. As an option, the automotive system **1900** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the automotive system **1900** may be implemented in any desired environment. Again, the aforementioned definitions may equally apply to the description below.

[00114] With the automotive system **1900**, any of the message delivery and/or display, data collection, etc. disclosed herein may be carried out utilizing one or more components of the vehicular assembly of the automotive system, a separate mobile device (e.g. smartphone, tablet, etc.), and/or a combination thereof. For example, in one possible embodiment, the automotive system may perform any functionality independent of any

separate mobile device. In another embodiment, however, one or more components of the separate mobile device (e.g. a communication channel, processing capability, etc.) may be used to perform a first portion of the functionality (e.g. receive message, process the message, etc.), while one or more components of the automotive system (e.g. a touchscreen, display, etc.) may be used to perform a second portion of the functionality (e.g. display the message, receive feedback in connection with the message, etc.).

[00115] In one embodiment, information distribution can be provided in vehicles. As shown, using an automotive system **1900**, for example, information about events and other location oriented dynamic content might be delivered (e.g. as described above with reference to the previous Figure(s)) and presented to vehicle occupants using an augmented reality display system that would indicate the direction of such an event or location related to the information. Such a display might also be used to highlight specific landmarks associated with such information (e.g. buildings, venues, locals, signs, etc.) as illustrated in the automotive information delivery using augmented reality interface **2000** shown in Figure **20**.

[00116] In the context of the present automotive system **1900**, a communication system (not shown) may be provided for enabling communication between a mobile device (not shown) and data/content providers/aggregators (not shown). For example, a mobile device may be capable of interfacing with a vehicle including various components of the vehicle. The mobile device may include any mobile device capable of interfacing with a vehicle including a lap-top computer, hand-held computer, mobile phone, personal digital assistant (PDA), a music player (e.g. a digital music player, etc.), a GPS device, etc.

[00117] In various embodiments, the mobile device may communicate with a vehicular assembly system (e.g. a communication and entertainment system, etc.) corresponding to the vehicle via a wireless connection (e.g. Bluetooth, etc.), or via a cable connection (e.g. a USB cable, a serial cable, etc.). As an option, the mobile device may interface with the communication and entertainment system vehicle utilizing an I/O port of the vehicle. In various embodiments, the I/O port may include a serial port, a

USB port, FireWire/i.LINK ports, MirrorLink ports, terminal mode ports, etc. In one embodiment, the I/O port may include a wireless communication port.

[00118] Using this interface, the mobile device may interface with various components and functionality of the vehicle (which may or may not be shown in Figure **19**), such as an onboard computer system including a processor, memory (e.g. DRAM, flash memory, etc.), an onboard navigation system, displays (e.g. a central display, and one or more passenger displays, etc.), audio communication devices (e.g. speakers, a microphone, etc.), and various other components and functionality of the vehicle included in the vehicular assembly system. The interface may also allow a user of the vehicle to access and/or control the mobile device utilizing controls associated with the vehicle, such as steering wheel, dashboard, and radio controls. Additionally, the user may access and/or control the mobile device utilizing the microphone through voice commands.

[00119] Using these components and controls, a user may access and utilize one or more wireless networks associated with the mobile device. Coupled to the networks may be servers which are capable of communicating over the networks. Also coupled to the networks and the servers may be a plurality of clients.

[00120] Such servers and/or clients may each include a desktop computer, lap-top computer, hand-held computer, mobile phone, personal digital assistant (PDA), peripheral (e.g. printer, etc.), any component of a computer, and/or any other type of logic. In order to facilitate communication among the networks, at least one gateway is optionally coupled therebetween.

[00121] It should be noted that the computer system of the vehicle may include various software and applications for facilitating communication between the vehicle and the mobile device. For example, in various embodiments, the vehicle computer system may include an operating system (e.g. Windows Mobile, Linux, etc.), embedded speech recognition software, telephone call steering systems, automated telephone directory services, character recognition software, and imaging software.

[00122] Figure **20** illustrates an automotive augmented reality interface **2000**, in accordance with another embodiment. As an option, the automotive interface **2000** may be implemented in the context of the architecture and environment of the previous Figures and/or any subsequent Figure(s). Of course, however, the automotive interface **2000** may be implemented in any desired environment. Again, the aforementioned definitions may equally apply to the description below.

[00123] In various embodiments, the interface **2000** and related supported components may be equipped to receive and/or display and/or collect (e.g. via hand gestures, etc.) messages in any manner that is disclosed herein above in connection with other mobile devices, etc. As a further option, in view of a larger size of the interface **2000** (as compared with a phone, for example), additional attributes may be used to indicate a location and/or manner in which the messages are displayed. Further, such display may also be a function of a direction of travel of the vehicle (e.g. so that any directional information in the form of arrows or the like is properly oriented, etc.).

[00124] While various embodiments have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of a preferred embodiment should not be limited by any of the above-described exemplary embodiments, but should be defined only in accordance with the following claims and their equivalents.

CLAIMS

What is claimed is:

1. A computer program product embodied on a non-transitory computer readable medium, comprising:

code for identifying a location; and

code for communicating information with at least one mobile device, based on the location.

2. The computer program product of Claim 1, wherein the computer program product is operable such that the location is identified by being received.

3. The computer program product of Claim 1, wherein the computer program product is operable such that the location is identified by querying a database.

4. The computer program product of Claim 1, wherein the computer program product is operable such that the location is identified utilizing a global positioning system.

5. The computer program product of Claim 1, wherein the computer program product is operable such that the communicating information includes receiving the information.

6. The computer program product of Claim 1, wherein the computer program product is operable such that the communicating information includes sending the information.

7. The computer program product of Claim 1, wherein the computer program product is operable such that the communicating information includes displaying the information.

8. The computer program product of Claim 1, wherein the computer program product is operable such that the information includes an advertisement.

9. The computer program product of Claim 1, wherein the computer program product is operable such that the information is communicated, based on at least an indication.

10. The computer program product of Claim 9, wherein the computer program product is operable such that the at least one indication includes a preference of a user of the at least one mobile device.

11. The computer program product of Claim 1, wherein the computer program product is resident on the at least one mobile device.

12. The computer program product of Claim 1, wherein the computer program product is resident on a network component in communication with the at least one mobile device.

13. The computer program product of Claim 1, wherein the computer program product is operable such that the information is received from at least one other mobile device.

14. An apparatus, comprising:

logic for identifying a location; and

logic for communicating information with the at least one mobile device, based on the location.

15. A computer program product embodied on a non-transitory computer readable medium, comprising:

code for receiving information and relevancy data at at least one mobile device; and

code for conditionally acting on the information with the at least one mobile device, based on a relevancy data.

16. The computer program product of Claim 15, wherein the computer program product is operable such that the relevancy data is based on a location of the at least one mobile device.

17. The computer program product of Claim 15, wherein the computer program product is operable such that the relevancy data is based on a preference of a user of the at least one mobile device.

18. The computer program product of Claim 15, wherein the computer program product is operable such that the acting includes displaying.

19. The computer program product of Claim 15, wherein the computer program product is operable such that the acting includes communicating.

ABSTRACT

A system, method, and computer program product are provided for location and/or relevancy based triggers for mobile devices. In one embodiment, a location is identified, and information is communicated with the at least one mobile device, based on the location. In another embodiment, information and relevancy data is received at at least one mobile device, and the information is conditionally displayed with the at least one mobile device, based on the relevancy data.

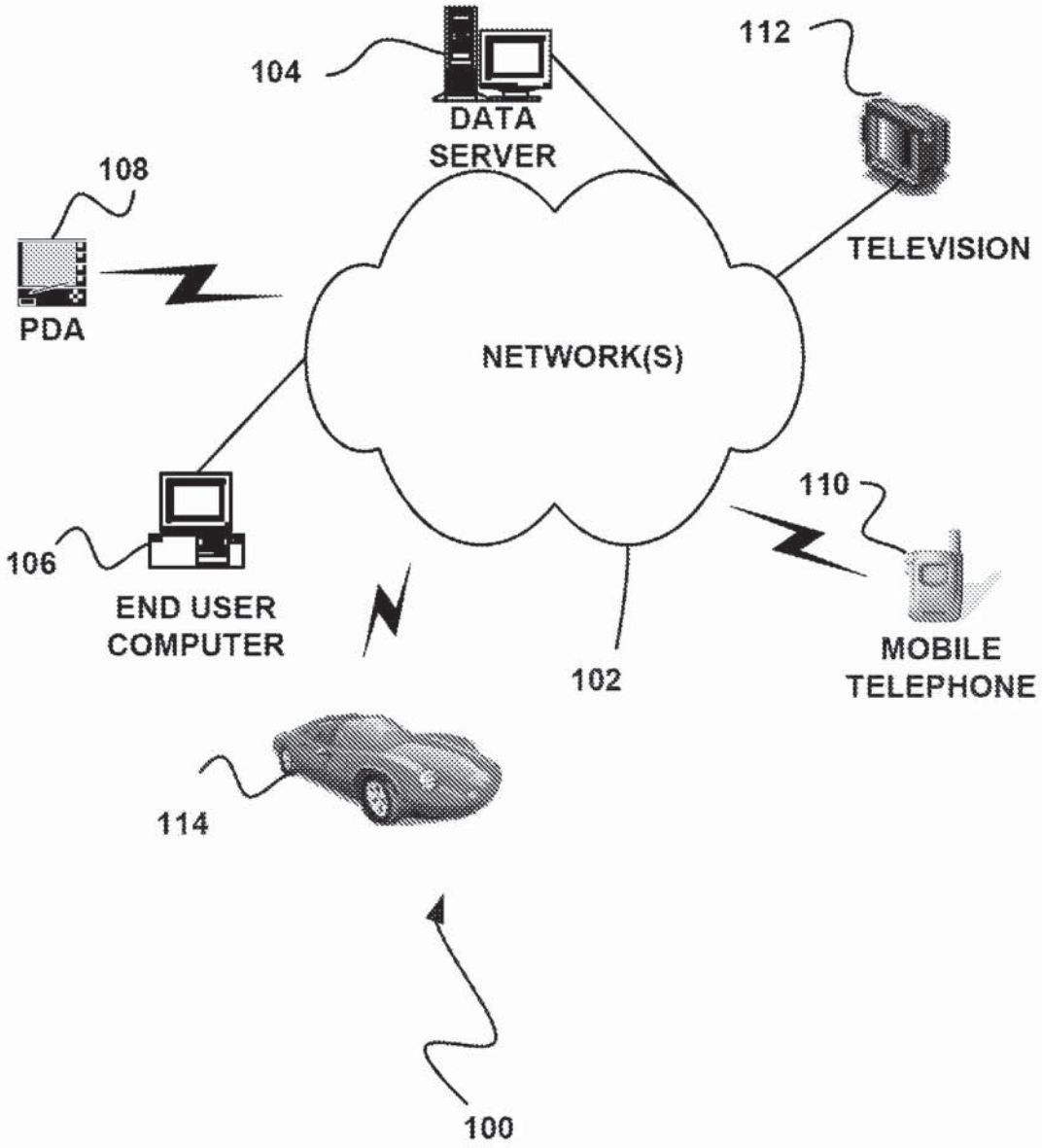
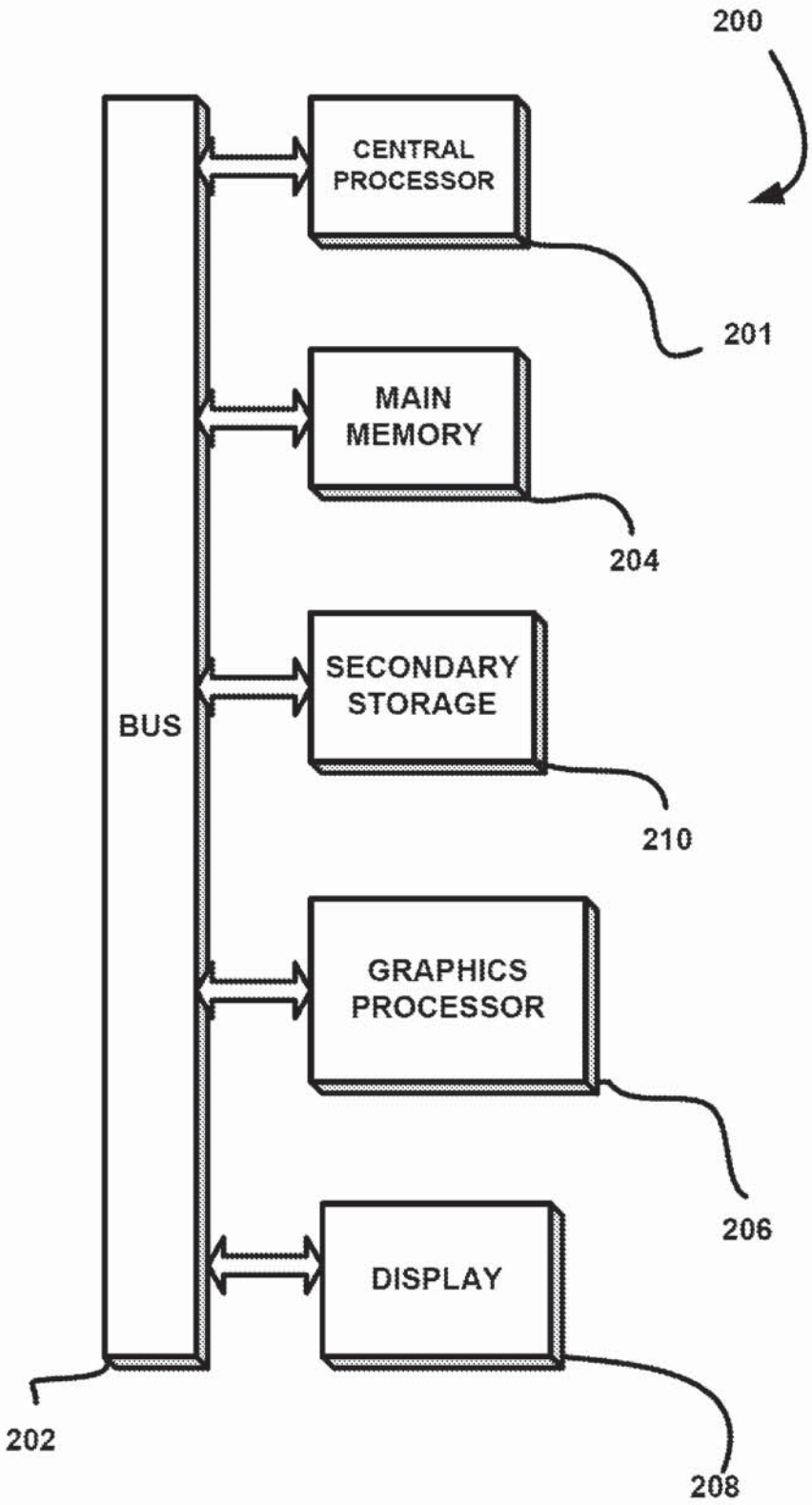

104
DATA SERVER
112
TELEVISION
108
PDA
NETWORK(S)
106
END USER COMPUTER
110
MOBILE TELEPHONE
102
114
100

FIGURE 1


200
CENTRAL PROCESSOR
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MAIN MEMORY
204
SECONDARY STORAGE
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BUS
GRAPHICS PROCESSOR
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DISPLAY
208
202

FIGURE 2

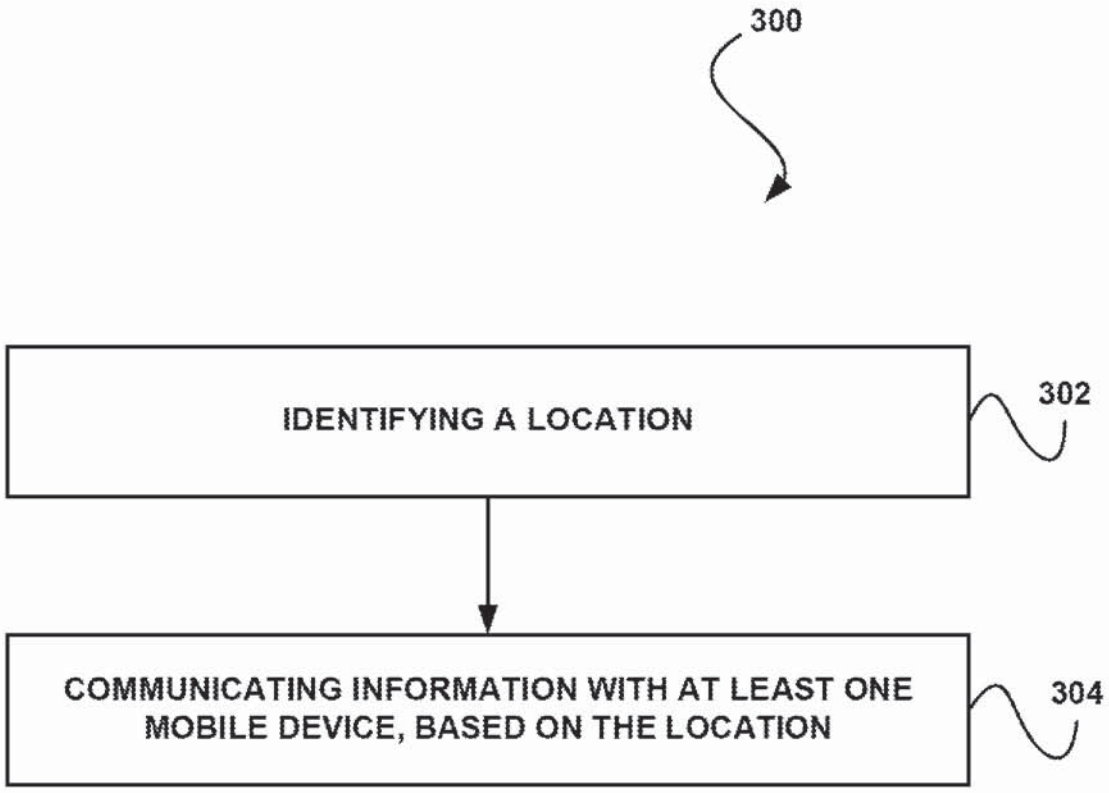

300
IDENTIFYING A LOCATION
302
COMMUNICATING INFORMATION WITH AT LEAST ONE MOBILE DEVICE, BASED ON THE LOCATION
304

FIGURE 3

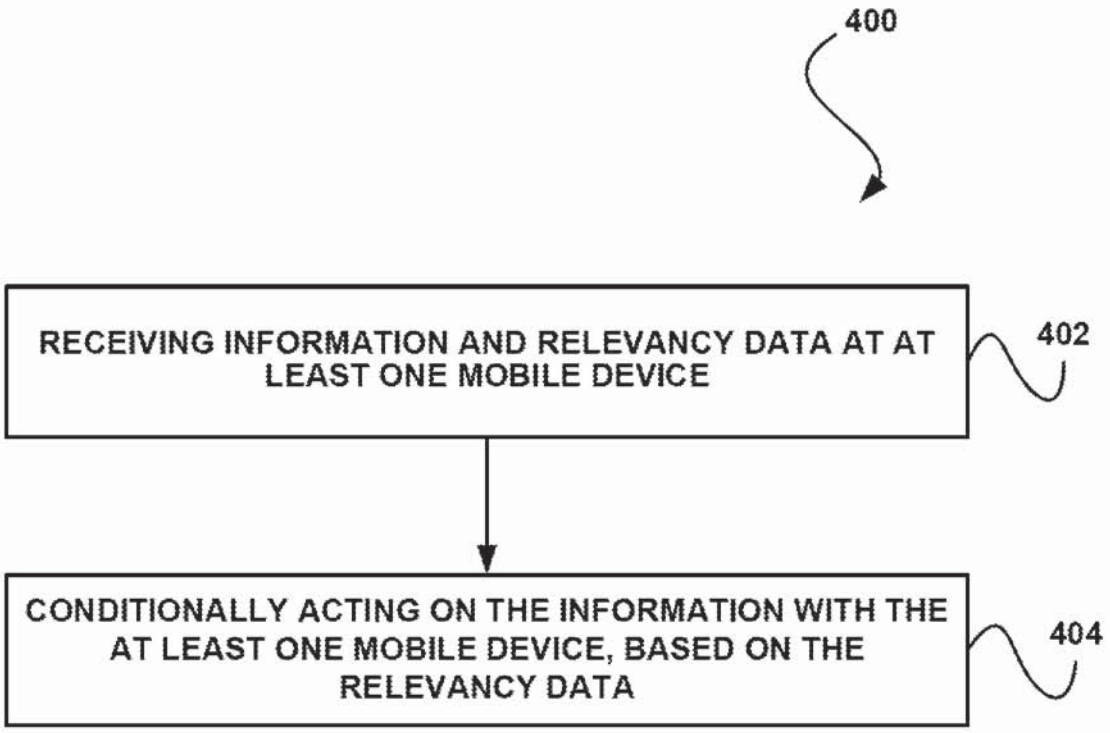
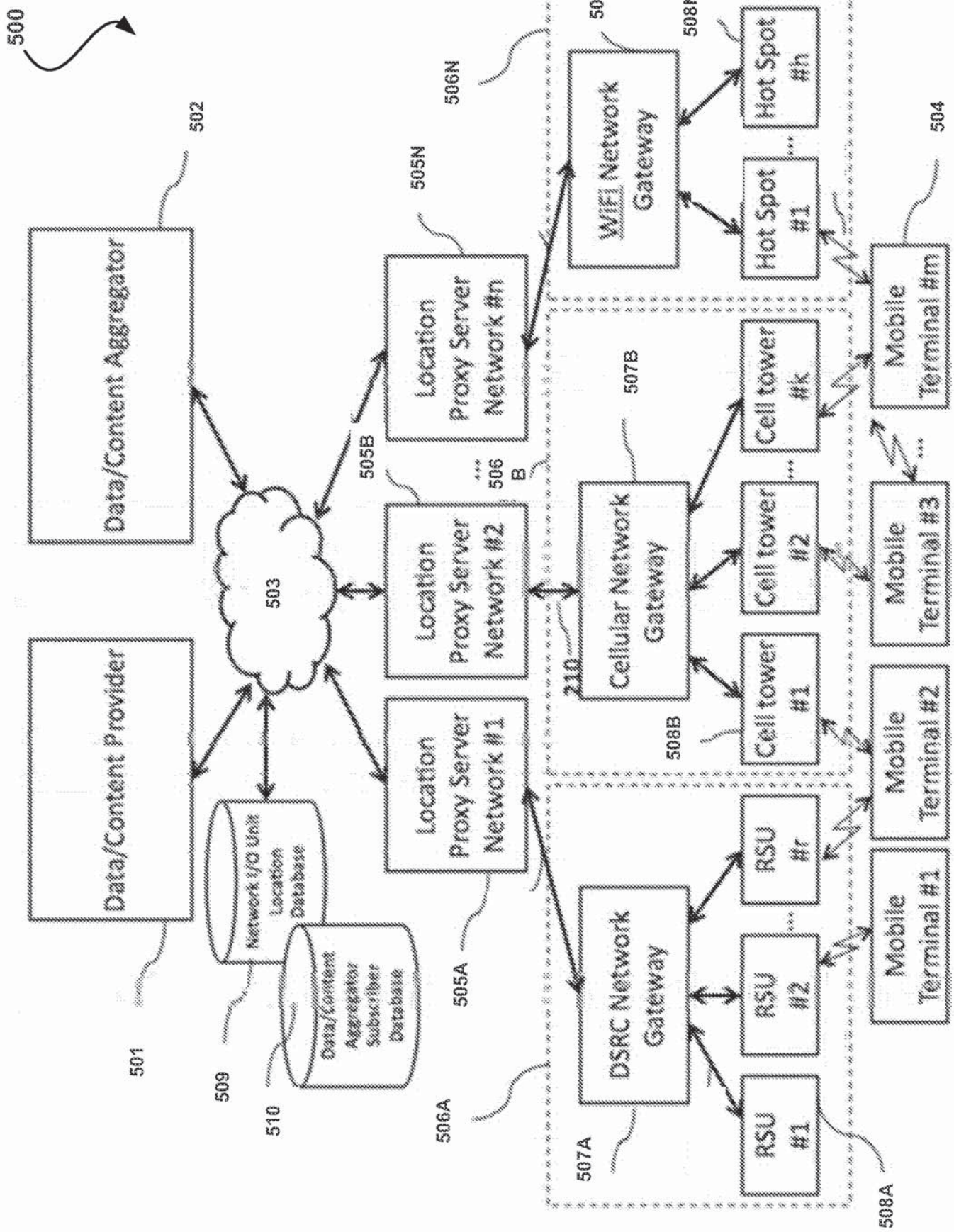

400
RECEIVING INFORMATION AND RELEVANCY DATA AT AT LEAST ONE MOBILE DEVICE
402
CONDITIONALLY ACTING ON THE INFORMATION WITH THE AT LEAST ONE MOBILE DEVICE, BASED ON THE RELEVANCY DATA
404

FIGURE 4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Data/Content Aggregator
502
Data/Content Provider
501
503
Location Proxy Server Network #n
505N
506N
Location Proxy Server Network #2
505B
506B
Location Proxy Server Network #1
505A
506A
Network I/O Unit Location Database
509
Data/Content Aggregator Subscriber Database
510
WiFi Network Gateway
507N
508N
Hot Spot #h
Hot Spot #1
Cellular Network Gateway
210
507B
508B
Cell tower #k
Cell tower #2
Cell tower #1
DSRC Network Gateway
507A
508A
RSU #r
RSU #2
RSU #1
Mobile Terminal #m
Mobile Terminal #3
Mobile Terminal #2
Mobile Terminal #1
504

FIGURE 5

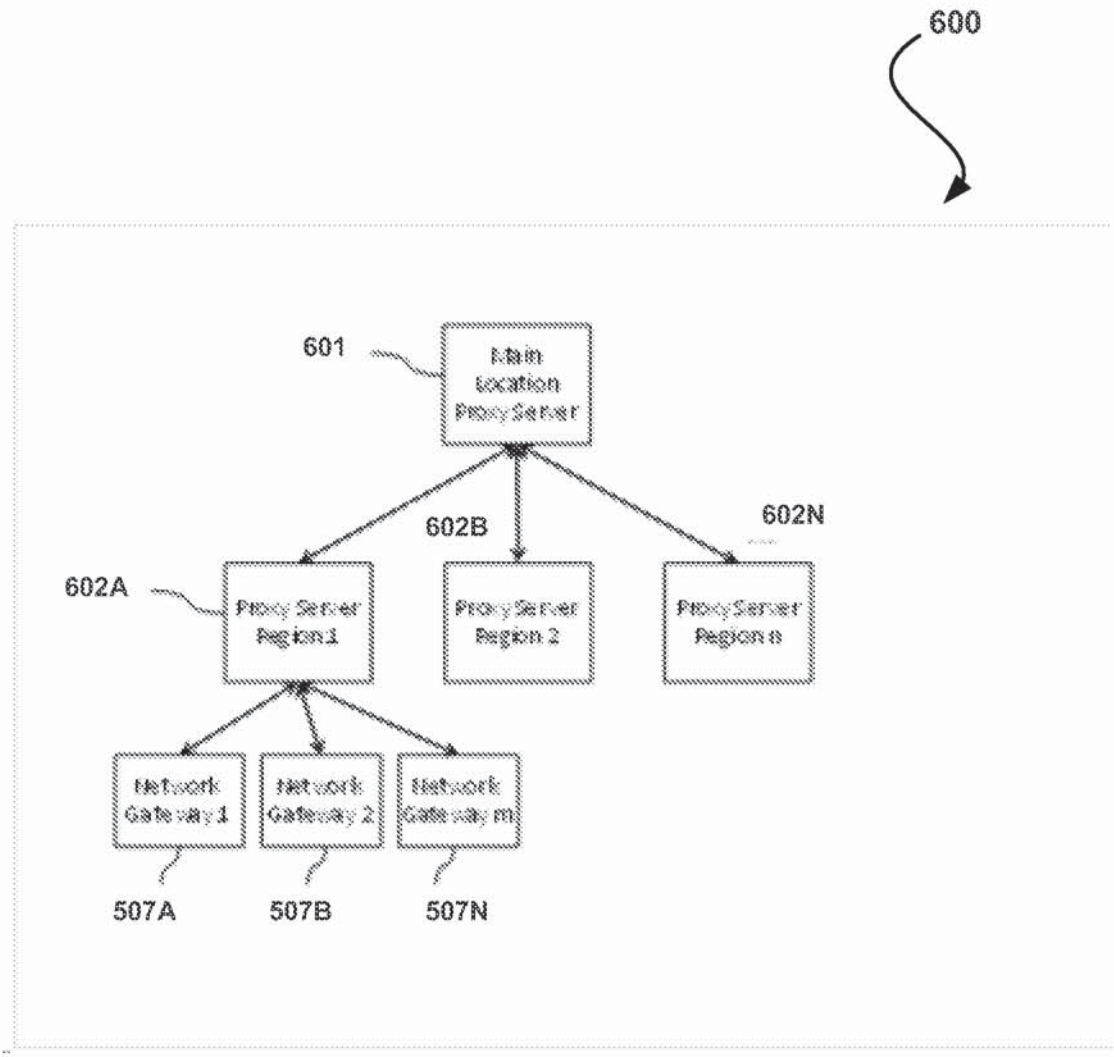
600
601
Main Location Proxy Server
602B
602N
602A
Proxy Server Region 1
Proxy Server Region 2
Proxy Server Region n
Network Gateway 1
Network Gateway 2
Network Gateway m
507A
507B
507N

FIGURE 6A

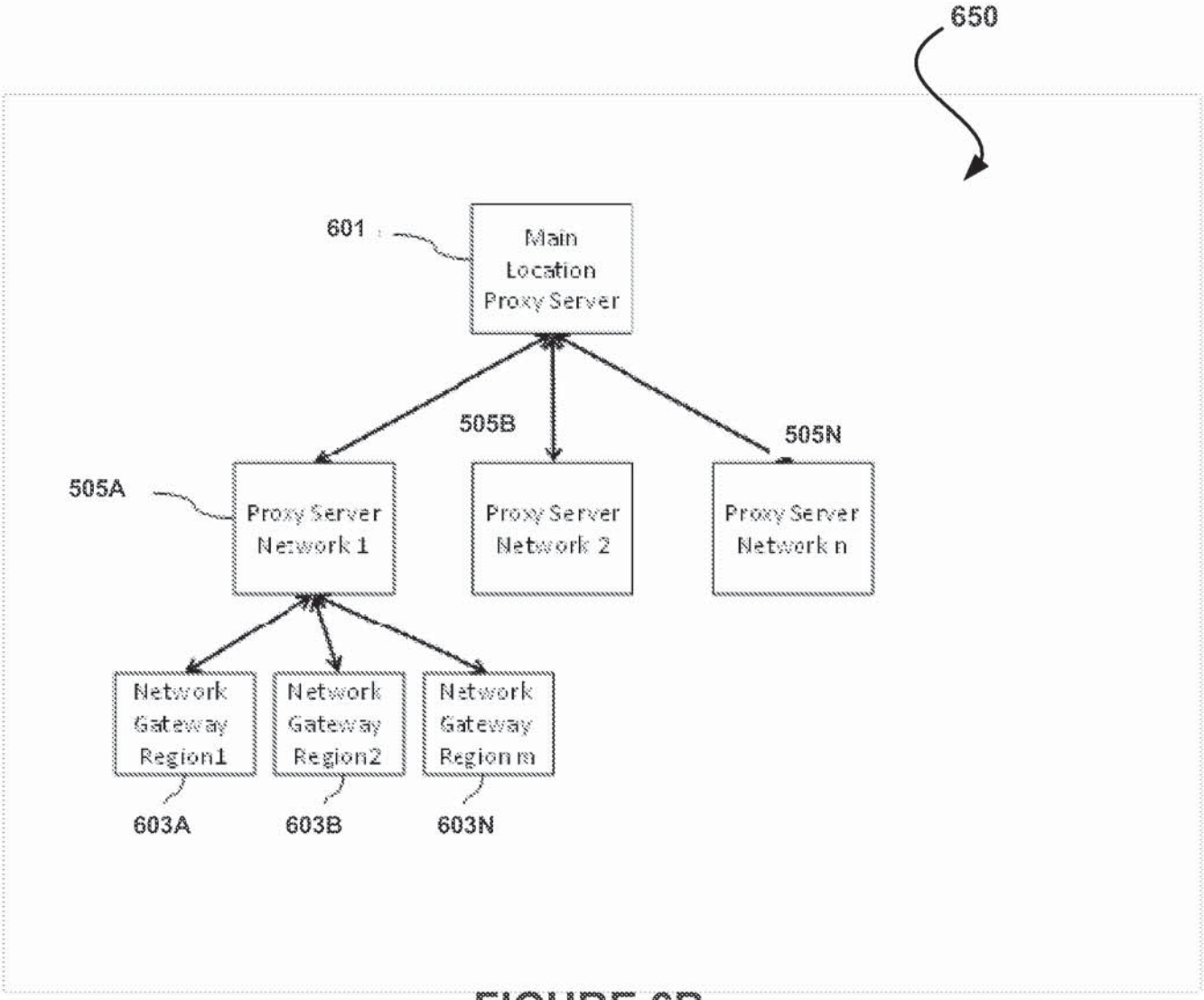
650
601
Main Location Proxy Server
505B
505N
505A
Proxy Server Network 1
Proxy Server Network 2
Proxy Server Network n
Network Gateway Region1
Network Gateway Region2
Network Gateway Region m
603A
603B
603N

FIGURE 6B

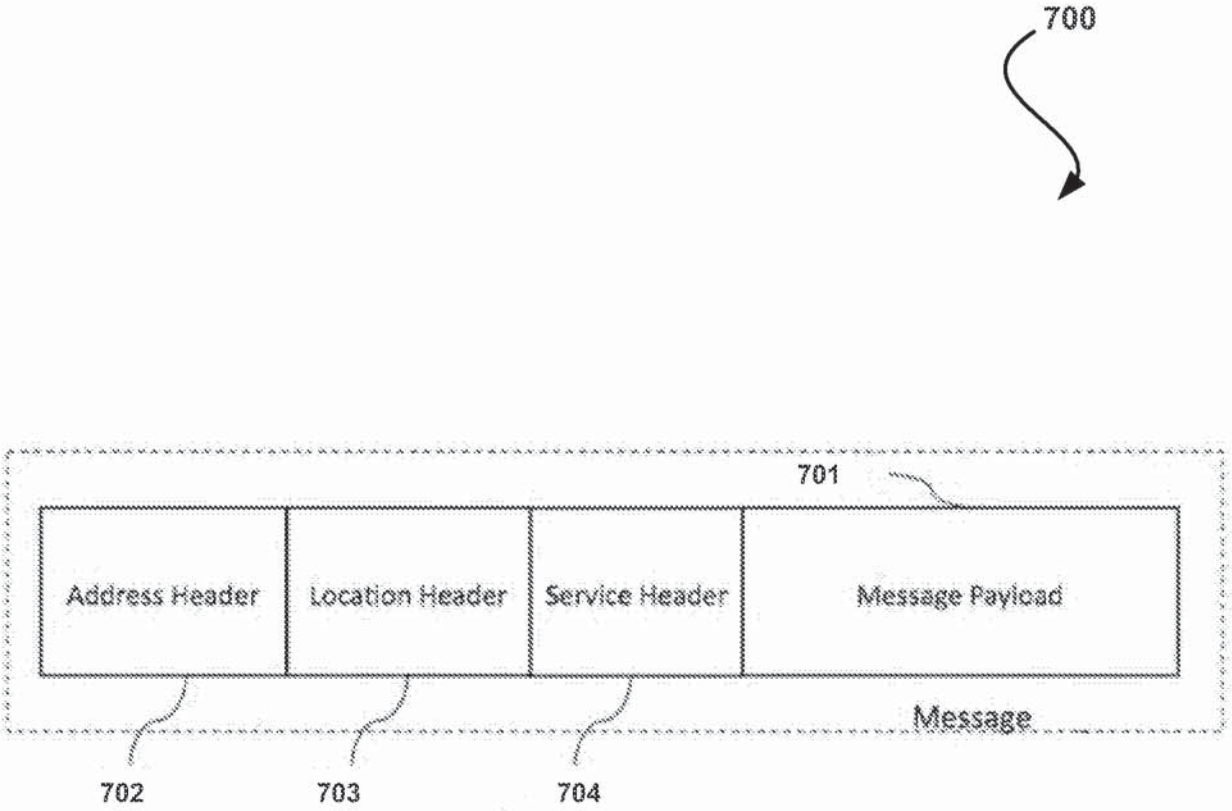
700
701
Address Header
Location Header
Service Header
Message Payload
Message
702
703
704

FIGURE 7

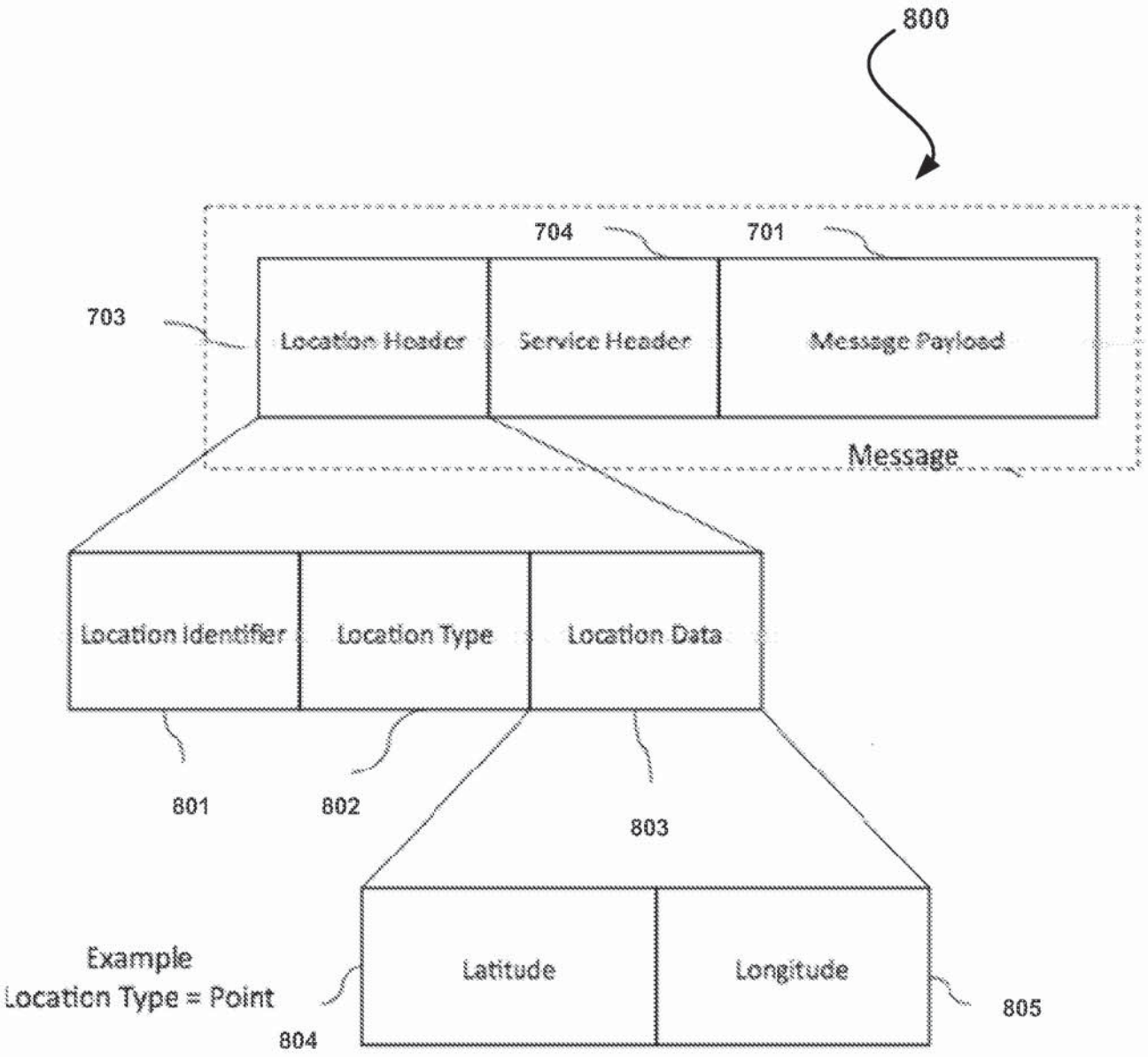
800
704
701
703
Location Header
Service Header
Message Payload
Message
Location Identifier
Location Type
Location Data
801
802
803
Example
Location Type = Point
Latitude
Longitude
804
805

FIGURE 8

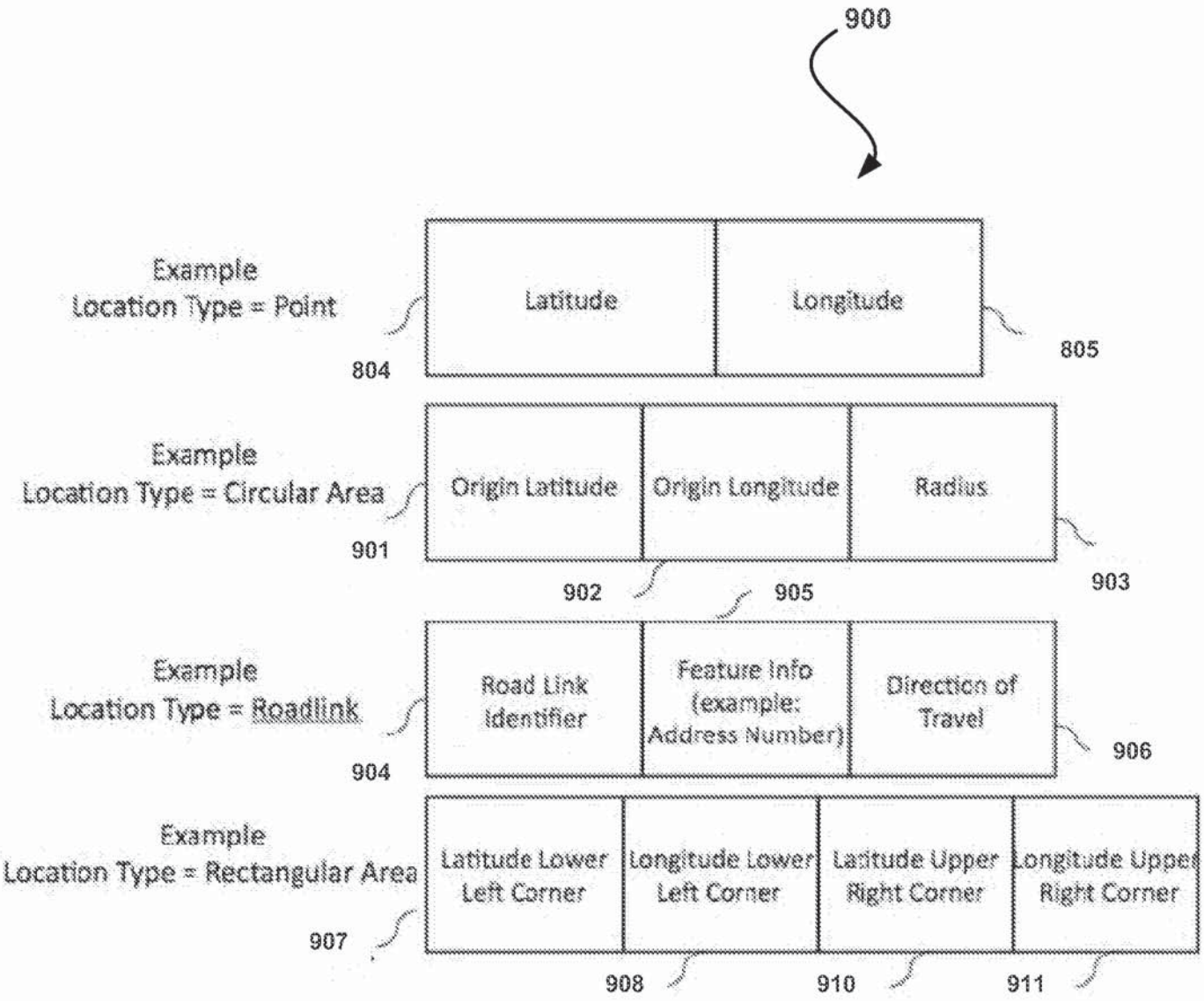
900
Example
Location Type = Point
Latitude
Longitude
804
805
Example
Location Type = Circular Area
Origin Latitude
Origin Longitude
Radius
901
902
905
903
Example
Location Type = Roadlink
Road Link Identifier
Feature Info (example: Address Number)
Direction of Travel
904
906
Example
Location Type = Rectangular Area
Latitude Lower Left Corner
Longitude Lower Left Corner
Latitude Upper Right Corner
Longitude Upper Right Corner
907
908
910
911

FIGURE 9

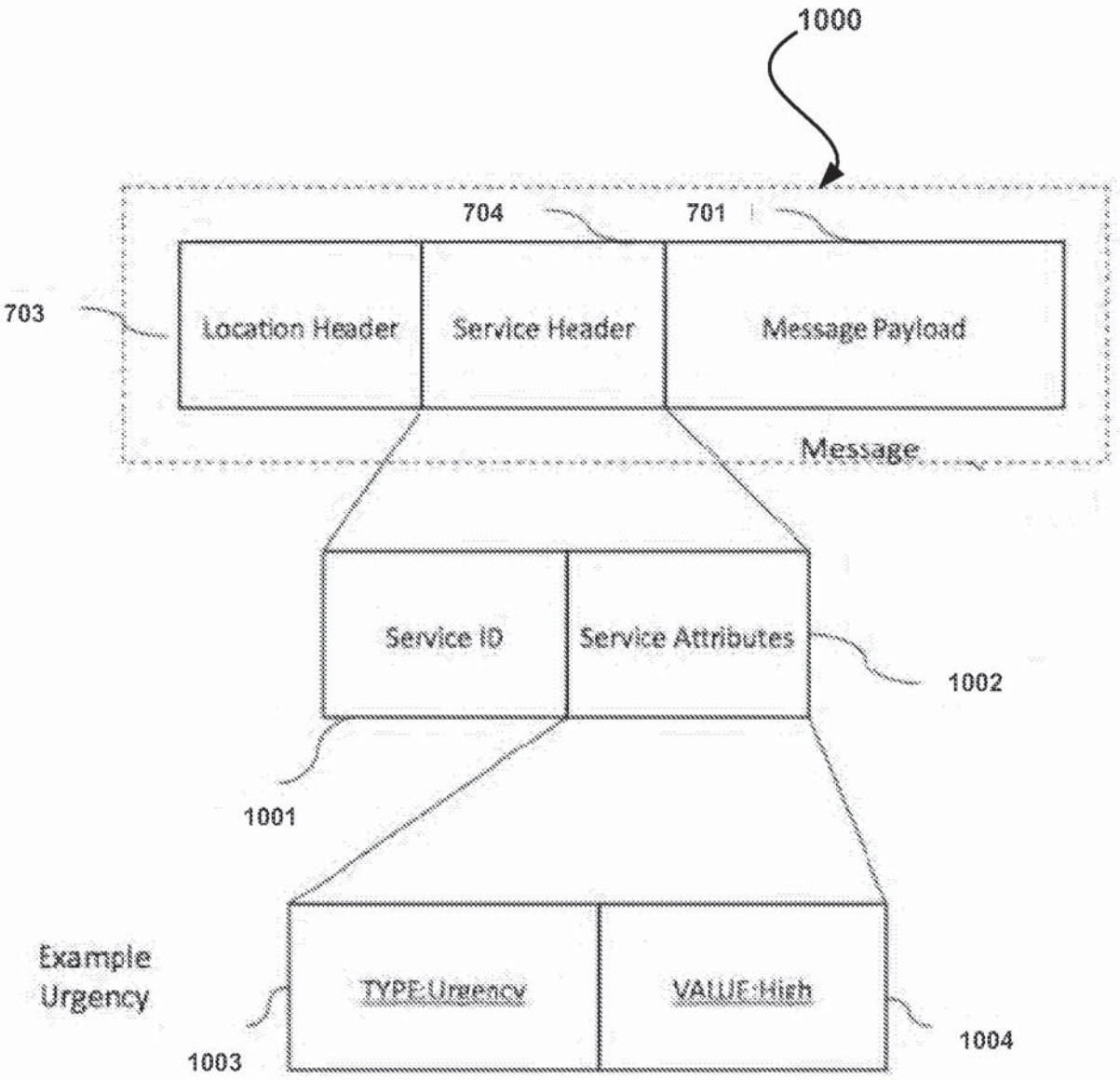
1000
704
701
703
Location Header
Service Header
Message Payload
Message
Service ID
Service Attributes
1002
1001
Example Urgency
TYPE:Urgency
VALUE:High
1003
1004

FIGURE 10

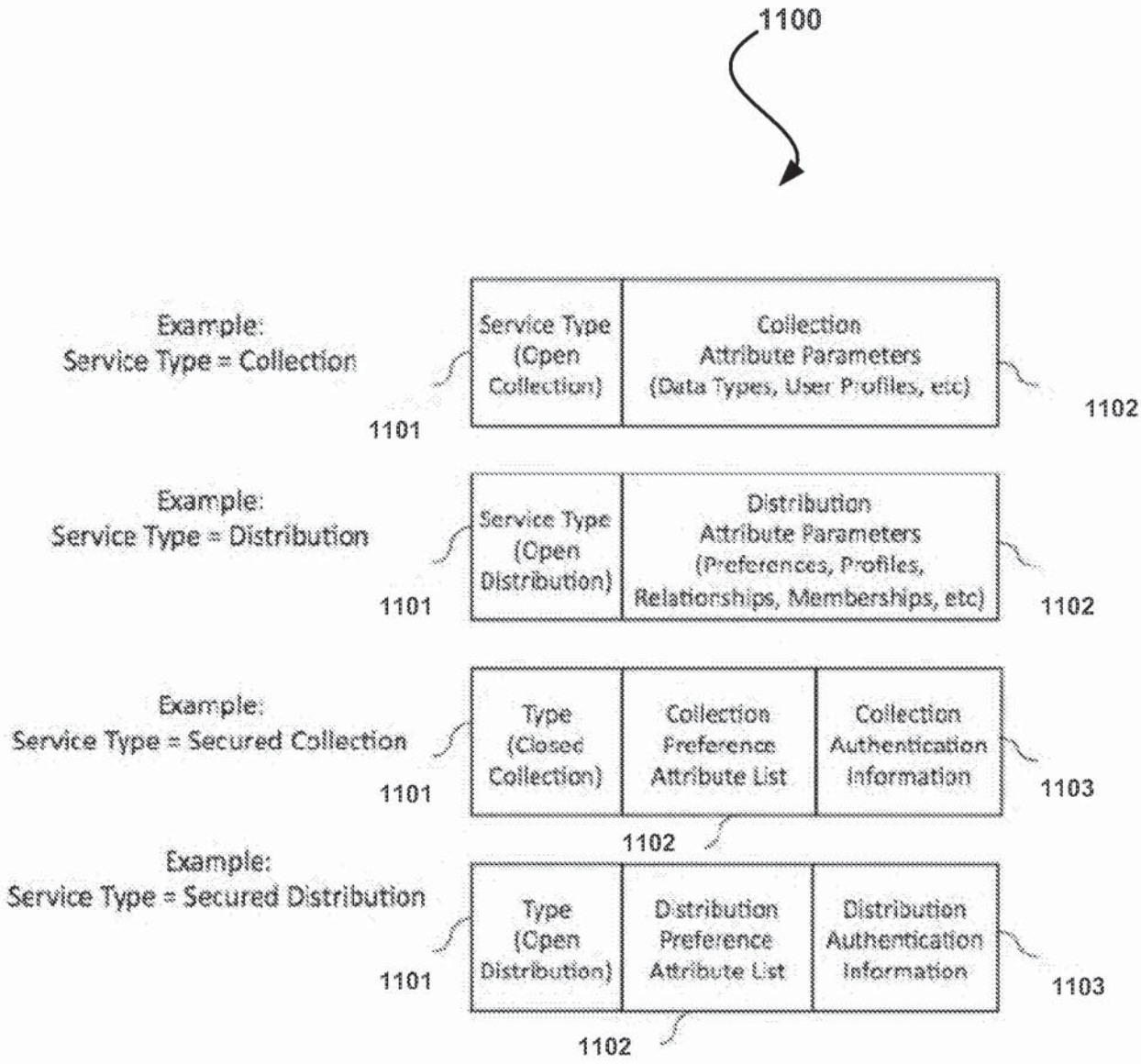
1100
Example:
Service Type = Collection
Service Type (Open Collection)
Collection Attribute Parameters (Data Types, User Profiles, etc)
1101
1102
Example:
Service Type = Distribution
Service Type (Open Distribution)
Distribution Attribute Parameters (Preferences, Profiles, Relationships, Memberships, etc)
1101
1102
Example:
Service Type = Secured Collection
Type (Closed Collection)
Collection Preference Attribute List
Collection Authentication Information
1101
1102
1103
Example:
Service Type = Secured Distribution
Type (Open Distribution)
Distribution Preference Attribute List
Distribution Authentication Information
1101
1102
1103

FIGURE 11

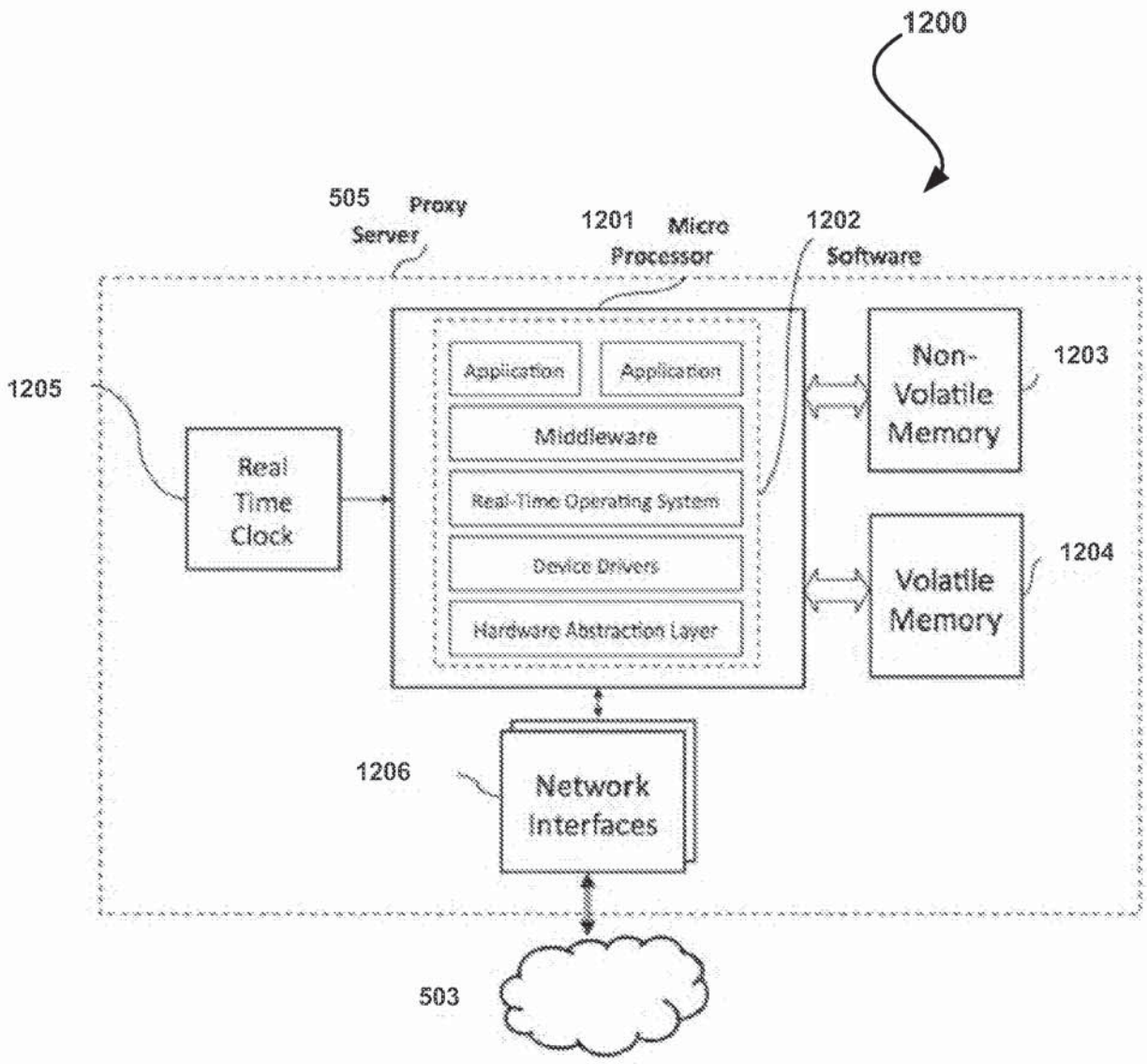
1200
505
Proxy Server
1201
Micro Processor
1202
Software
1205
Real Time Clock
Application
Application
Middleware
Real-Time Operating System
Device Drivers
Hardware Abstraction Layer
Non-Volatile Memory
1203
Volatile Memory
1204
1206
Network Interfaces
503

FIGURE 12

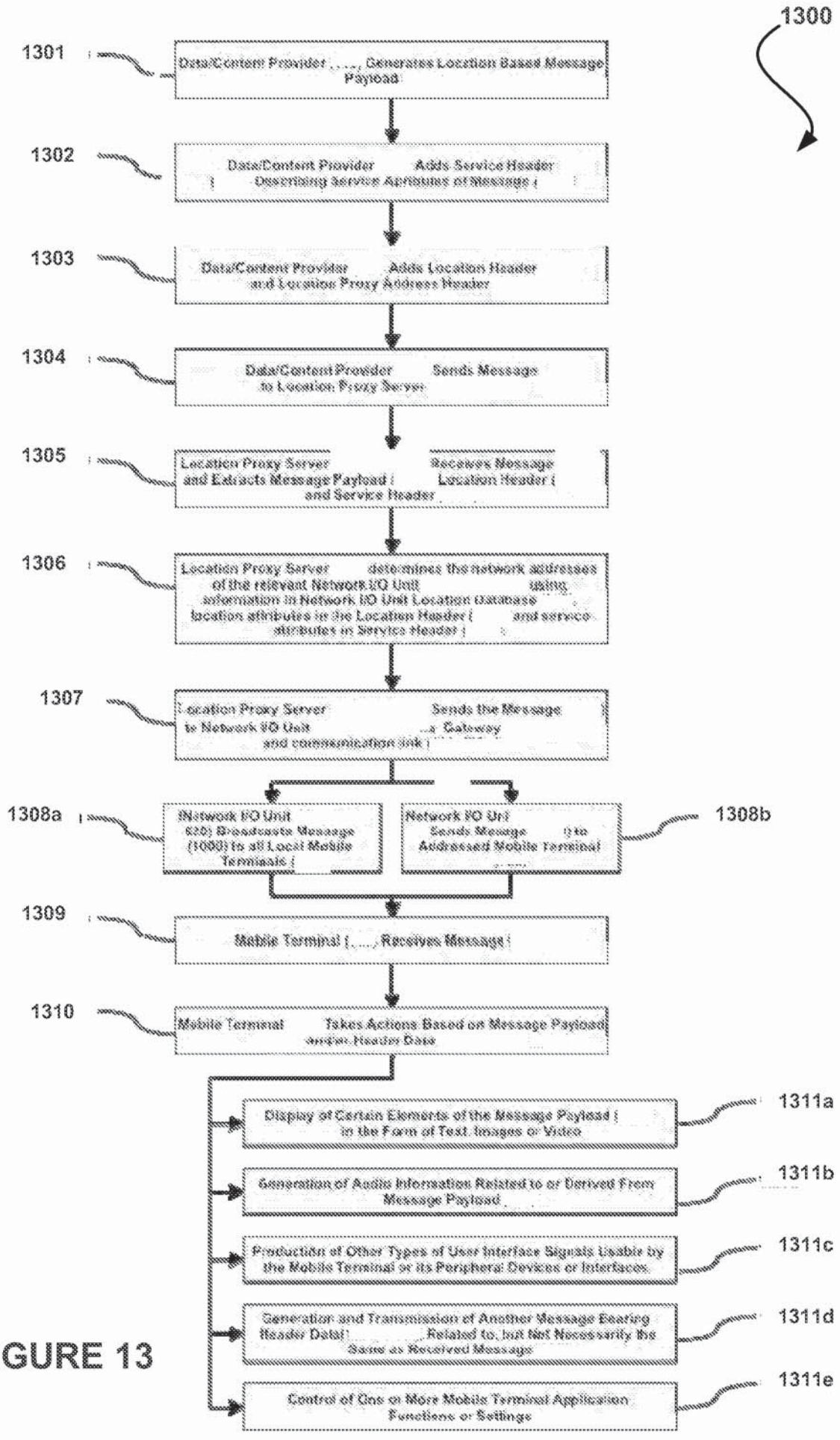
1300
1301
Data/Content Provider ..., Generates Location Based Message Payload
1302
Data/Content Provider Adds Service Header Describing Service Attributes of Message
1303
Data/Content Provider Adds Location Header and Location Proxy Address Header
1304
Data/Content Provider Sends Message to Location Proxy Server
1305
Location Proxy Server Receives Message and Extracts Message Payload Location Header and Service Header
1306
Location Proxy Server determines the network addresses of the relevant Network I/O Unit using information in Network I/O Unit Location Database location attributes in the Location Header and service attributes in Service Header
1307
Location Proxy Server Sends the Message to Network I/O Unit Gateway and communication link
1308a
Network I/O Unit (630) Broadcasts Message (1008) to all Local Mobile Terminals
1308b
Network I/O Unit Sends Message to Addressed Mobile Terminal
1309
Mobile Terminal ..., Receives Message
1310
Mobile Terminal Takes Actions Based on Message Payload and/or Header Data
1311a
Display of Certain Elements of the Message Payload in the Form of Text, Images or Video
1311b
Generation of Audio Information Related to or Derived From Message Payload
1311c
Production of Other Types of User Interface Signals Usable by the Mobile Terminal or its Peripheral Devices or Interfaces
1311d
Generation and Transmission of Another Message Bearing Header Data Related to, but Not Necessarily the Same as Received Message
1311e
Control of One or More Mobile Terminal Application Functions or Settings

FIGURE 13

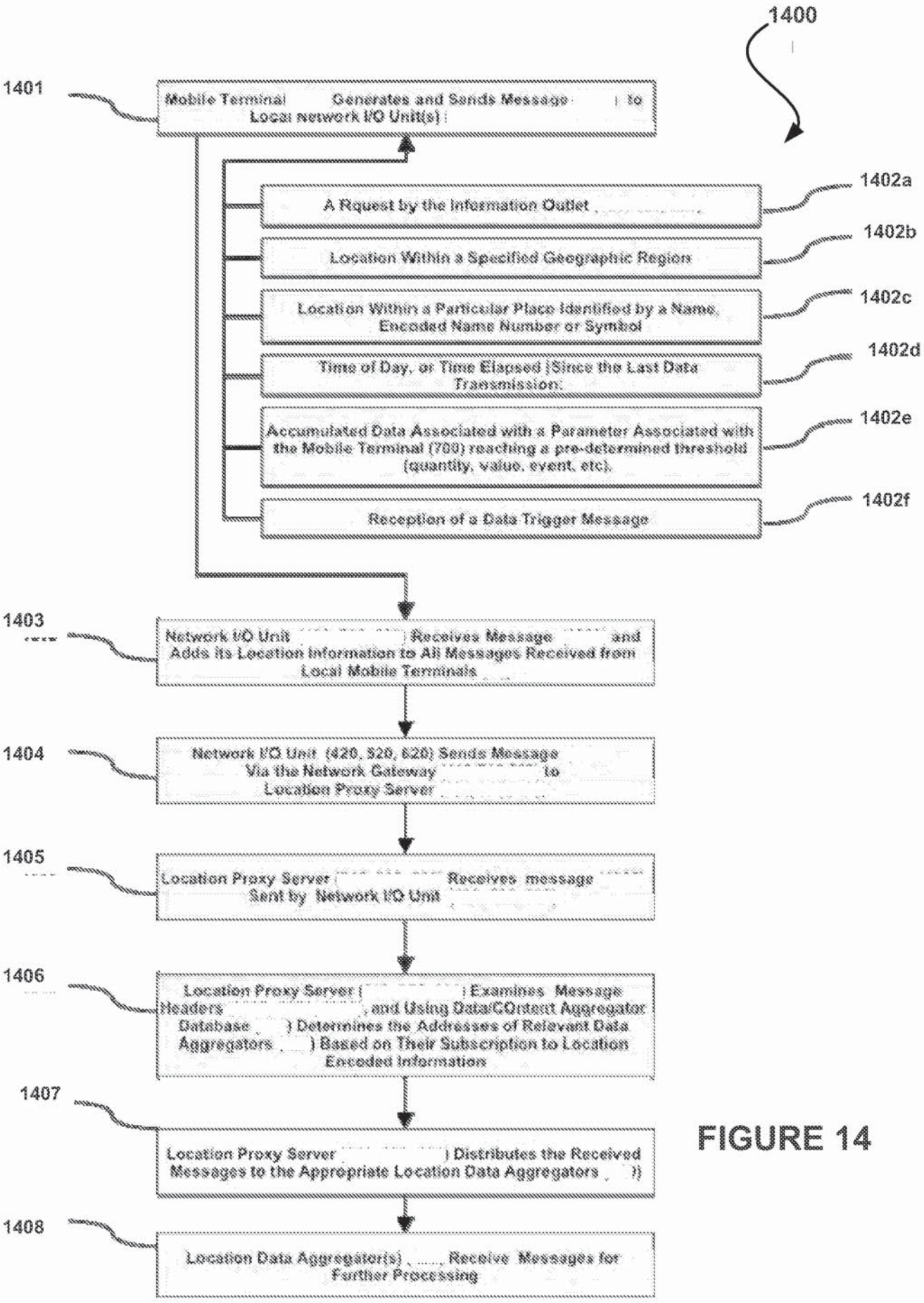
1400
1401
Mobile Terminal Generates and Sends Message to Local network I/O Unit(s)
1402a
A Rquest by the Information Outlet
1402b
Location Within a Specified Geographic Region
1402c
Location Within a Particular Place Identified by a Name, Encoded Name Number or Symbol
1402d
Time of Day, or Time Elapsed Since the Last Data Transmission:
1402e
Accumulated Data Associated with a Parameter Associated with the Mobile Terminal (700) reaching a pre-determined threshold (quantity, value, event, etc).
1402f
Reception of a Data Trigger Message
1403
Network I/O Unit Receives Message and Adds its Location Information to All Messages Received from Local Mobile Terminals
1404
Network I/O Unit (620, 520, 620) Sends Message Via the Network Gateway to Location Proxy Server
1405
Location Proxy Server Receives message Sent by Network I/O Unit
1406
Location Proxy Server Examines Message Headers and Using Data/COntent Aggregator Database Determines the Addresses of Relevant Data Aggregators Based on Their Subscription to Location Encoded Information
1407
Location Proxy Server Distributes the Received Messages to the Appropriate Location Data Aggregators
1408
Location Data Aggregator(s) Receive Messages for Further Processing

FIGURE 14

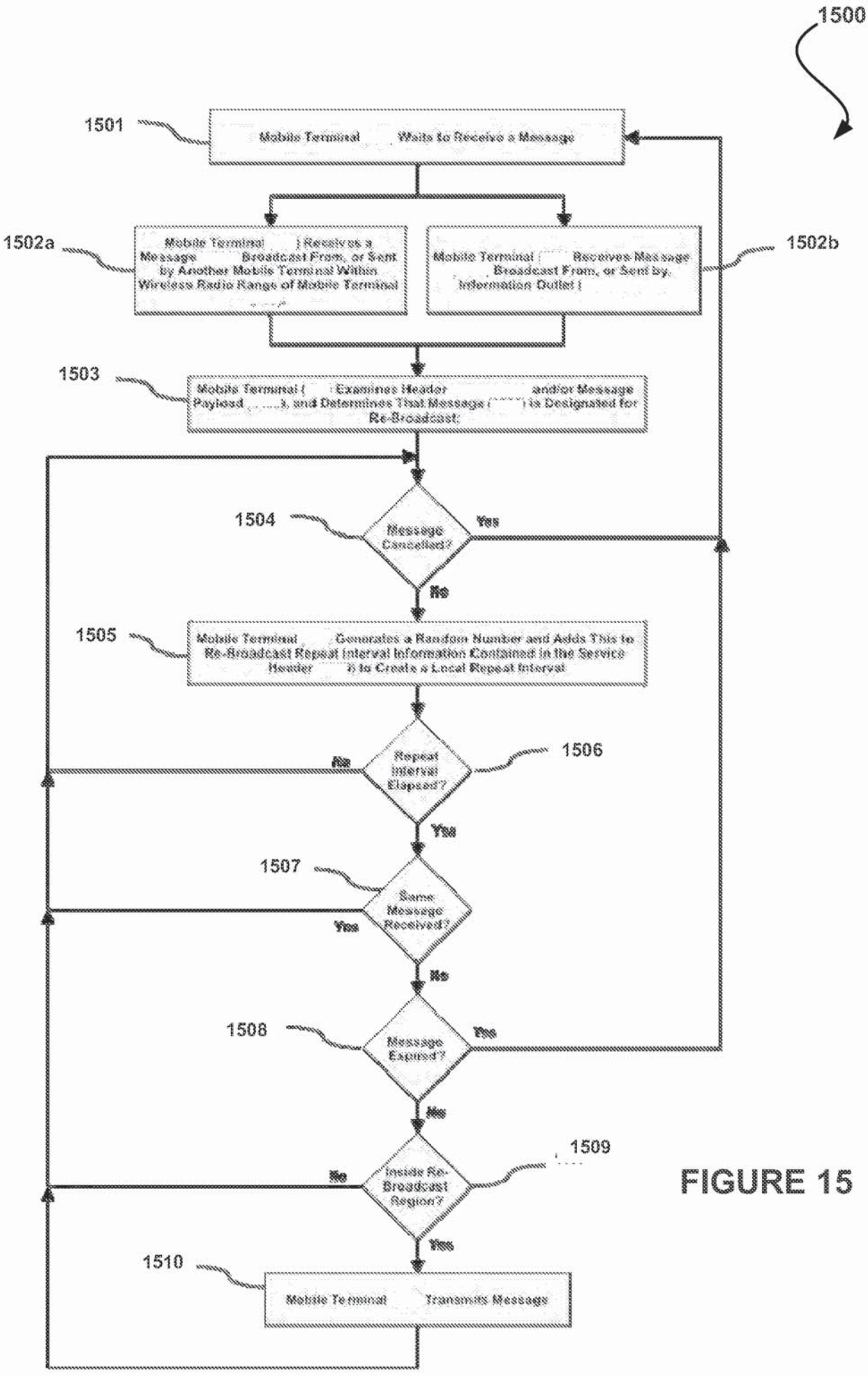
1500
1501
Mobile Terminal Waits to Receive a Message
1502a
Mobile Terminal Receives a Message Broadcast From, or Sent by Another Mobile Terminal Within Wireless Radio Range of Mobile Terminal
1502b
Mobile Terminal Receives Message Broadcast From, or Sent by, Information Outlet
1503
Mobile Terminal Examines Header and/or Message Payload, and Determines That Message Is Designated for Re-Broadcast
1504
Message Cancelled?
Yes
No
1505
Mobile Terminal Generates a Random Number and Adds This to Re-Broadcast Repeat Interval Information Contained in the Service Header to Create a Local Repeat Interval
1506
Repeat Interval Elapsed?
No
Yes
1507
Same Message Received?
Yes
No
1508
Message Expired?
Yes
No
1509
Inside Re-Broadcast Region?
No
Yes
1510
Mobile Terminal Transmits Message

FIGURE 15

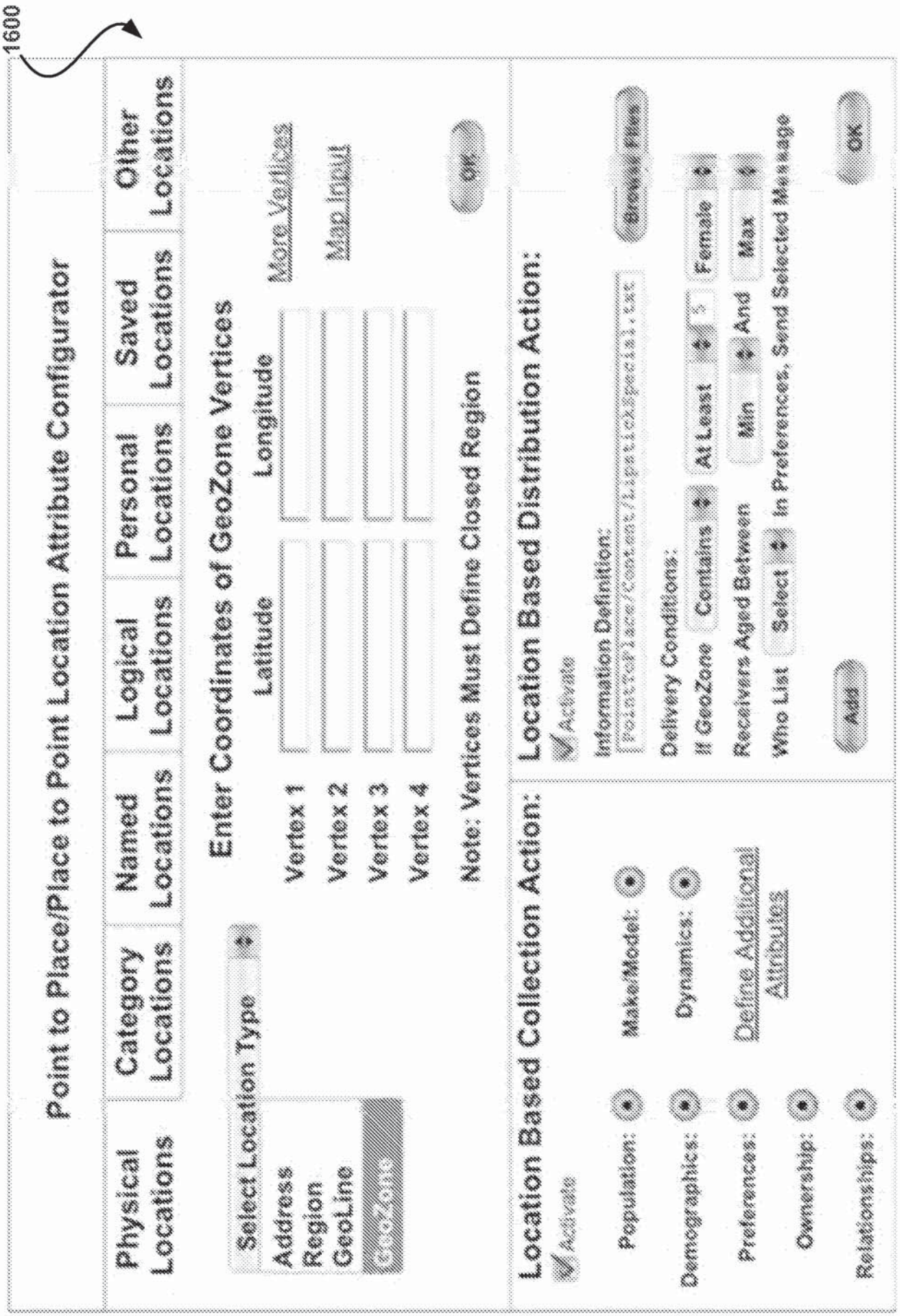
1600
Point to Place/Place to Point Location Attribute Configurator
Physical Locations
Category Locations
Named Locations
Logical Locations
Personal Locations
Saved Locations
Other Locations
Select Location Type
Address
Region
GeoLine
GeoZone
Enter Coordinates of GeoZone Vertices
Latitude
Longitude
More Vertices
Vertex 1
Vertex 2
Vertex 3
Vertex 4
Map Input
Note: Vertices Must Define Closed Region
OR
Location Based Collection Action:
Activate
Population:
Make/Model:
Demographics:
Dynamics:
Preferences:
Define Additional Attributes
Ownership:
Relationships:
Location Based Distribution Action:
Activate
Information Definition:
PointToPlace/Content/Lightbulb.txt
Browse Files
Delivery Conditions:
If GeoZone
Contains
At Least
3
Female
Receivers Aged Between
Min
And
Max
Who List
Select
In Preferences, Send Selected Message
Add
OK

FIGURE 16

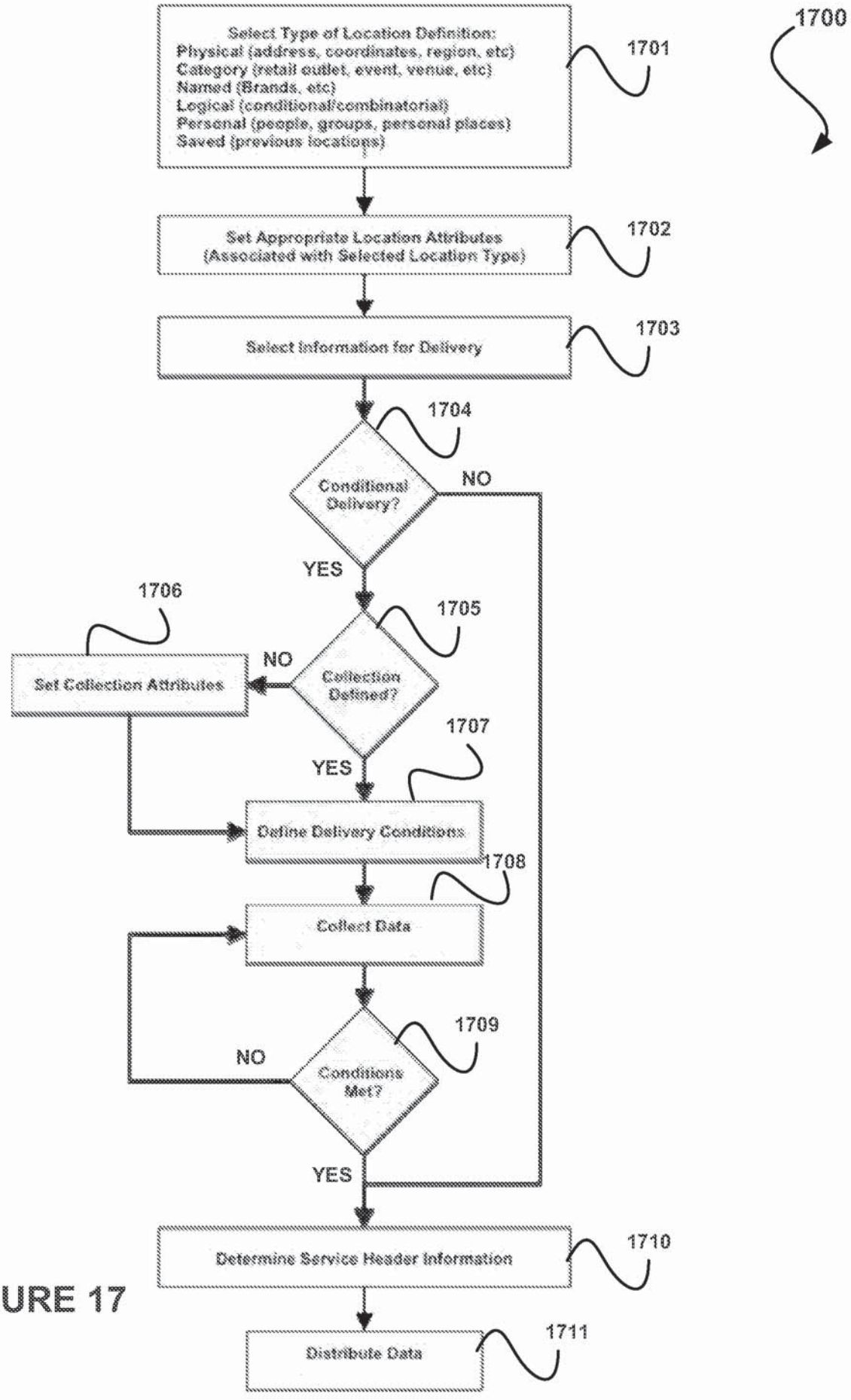
1700
Select Type of Location Definition:
Physical (address, coordinates, region, etc)
Category (retail outlet, event, venue, etc)
Named (Brands, etc)
Logical (conditional/combinatorial)
Personal (people, groups, personal places)
Saved (previous locations)
1701
Set Appropriate Location Attributes (Associated with Selected Location Type)
1702
Select Information for Delivery
1703
1704
Conditional Delivery?
NO
YES
1706
1705
Set Collection Attributes
NO
Collection Defined?
1707
YES
Define Delivery Conditions
1708
Collect Data
1709
NO
Conditions Met?
YES
Determine Service Header Information
1710
Distribute Data
1711

FIGURE 17

1800
Special Alert!!
Sale on Lancome Products
In the Macy's Cosmetics
Department
Bring This Message for a Special
Free Gift!
Advanced Notice!
The Tropical Horticultural Society
Annual Show and Convention has
been Schedulued in the
Chicagoland Region for June 30-
July 3. Text Orchid to 555-1234
for More Dtails
DANGER!!!
High Winds and Ice Reported 2
miles Ahead on the Verazzanno
Narrows Bridge! Use Extreme
Caution or Alternative Routes
Craft Fair
Hobby Faire Up
Ahead 3 Miles
Take Exit 33a and
Head East 2 Miles
to the Oswanna
Fair Grounds.
Plenty of Parking!
The Kids
Have
Arrived at
After School
Care
Alert! Potential
Match is in the
Vicinity! Do You
Want to Notify
Them?
No Thanks
Yes!!

FIGURE 18

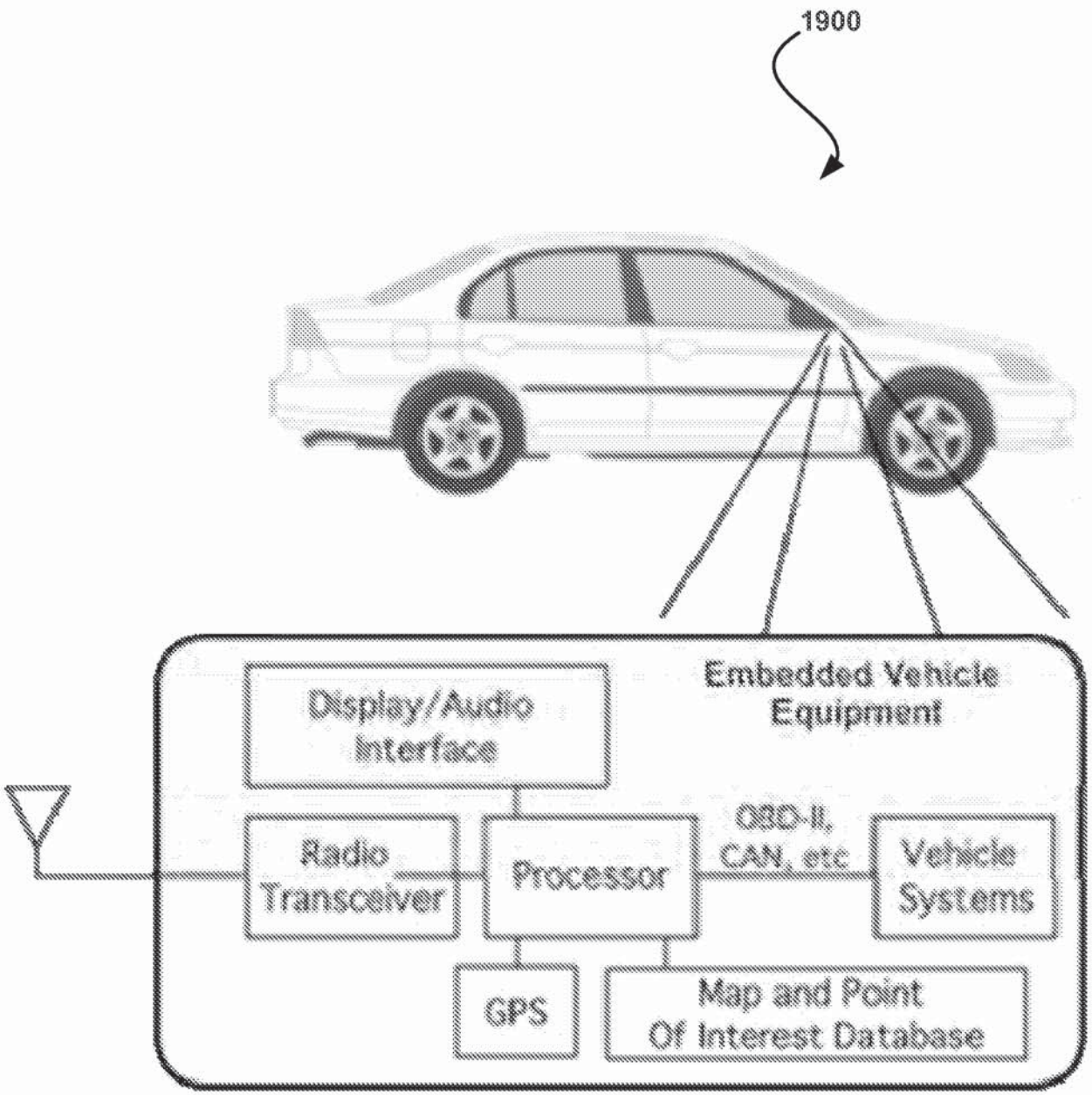
1900
Embedded Vehicle Equipment
Display/Audio Interface
Radio Transceiver
Processor
OBD-II, CAN, etc
Vehicle Systems
GPS
Map and Point Of Interest Database

FIGURE 19

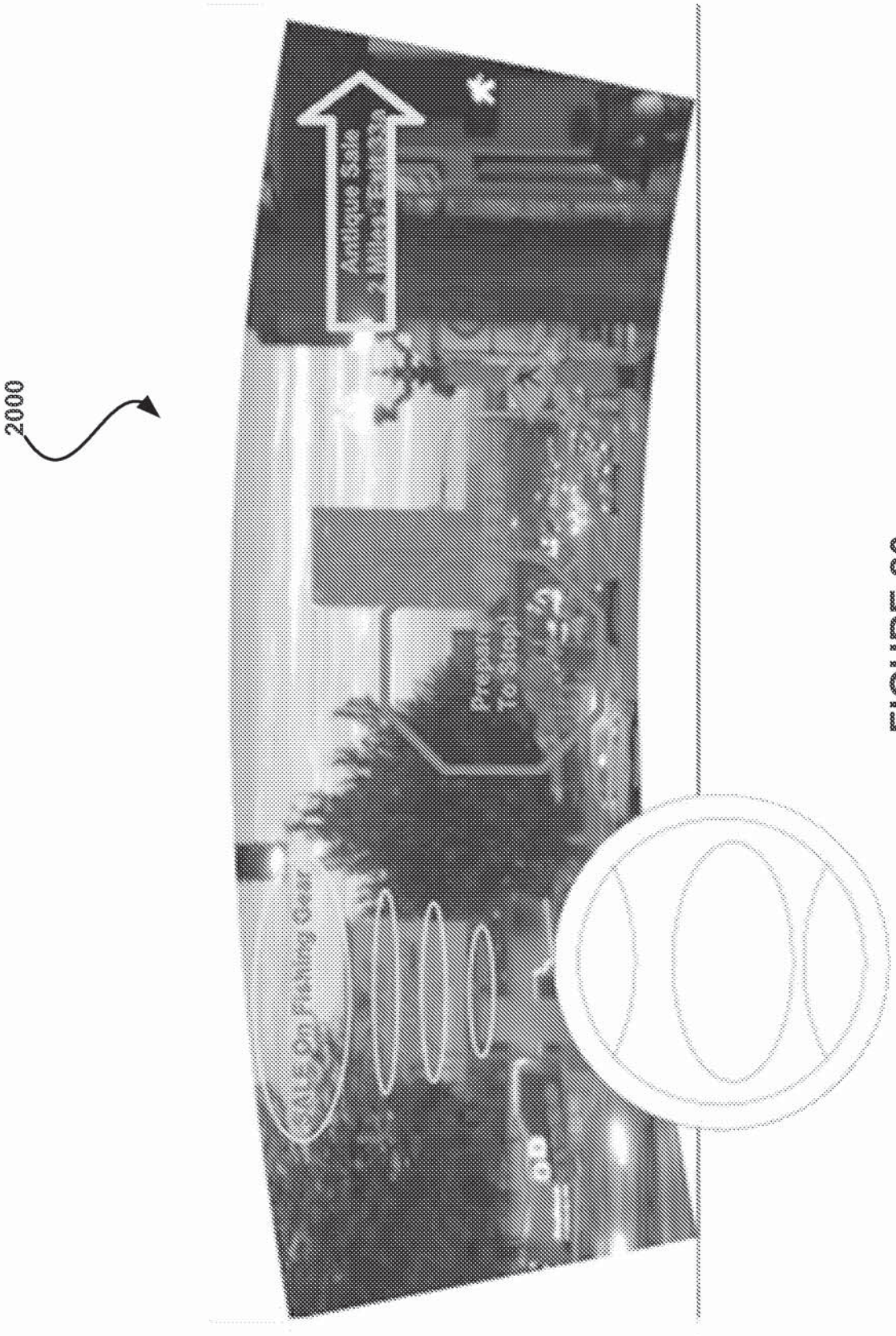

FIGURE 20